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THE COLOR COMPUTER MONTHLY MAGAZINE

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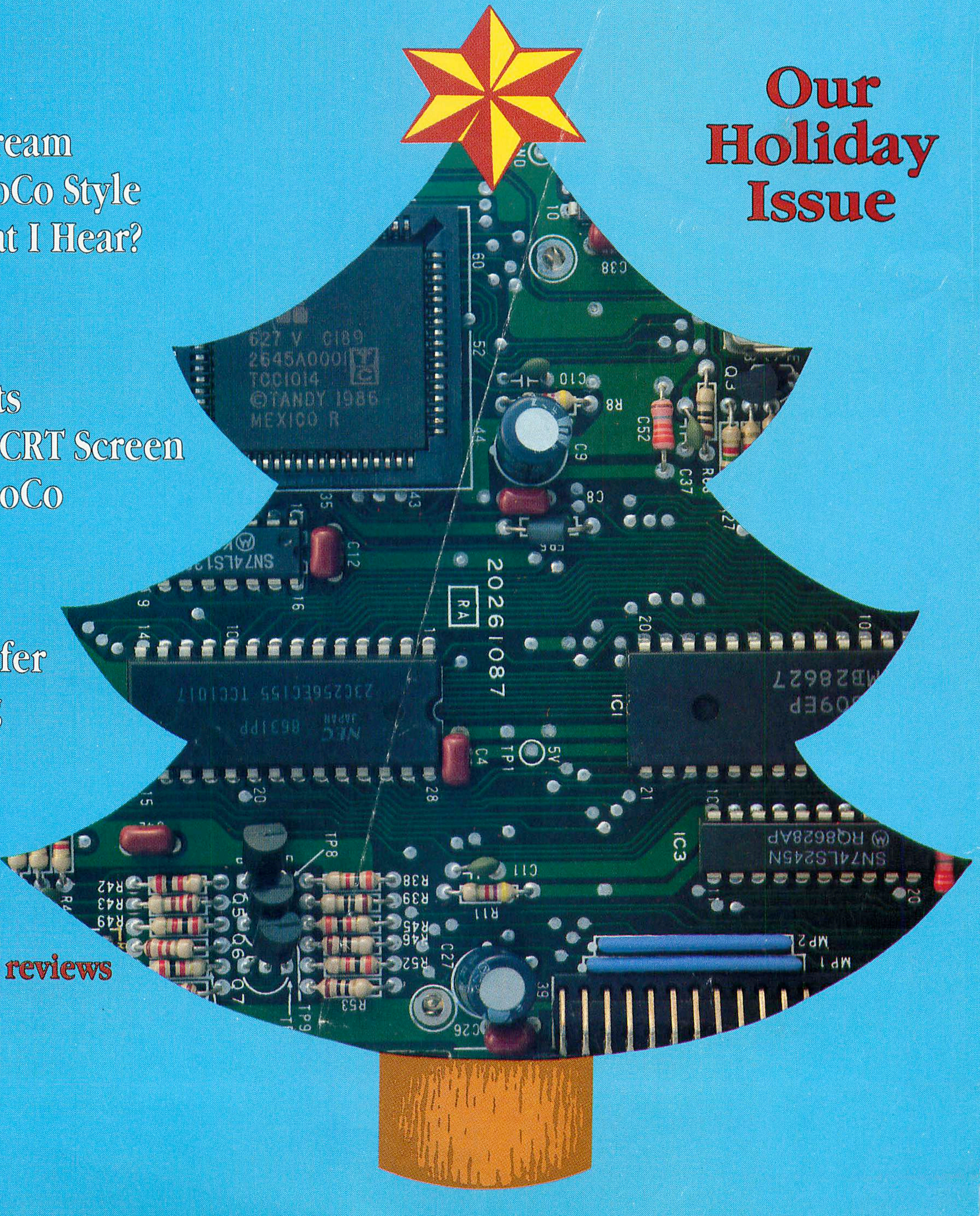
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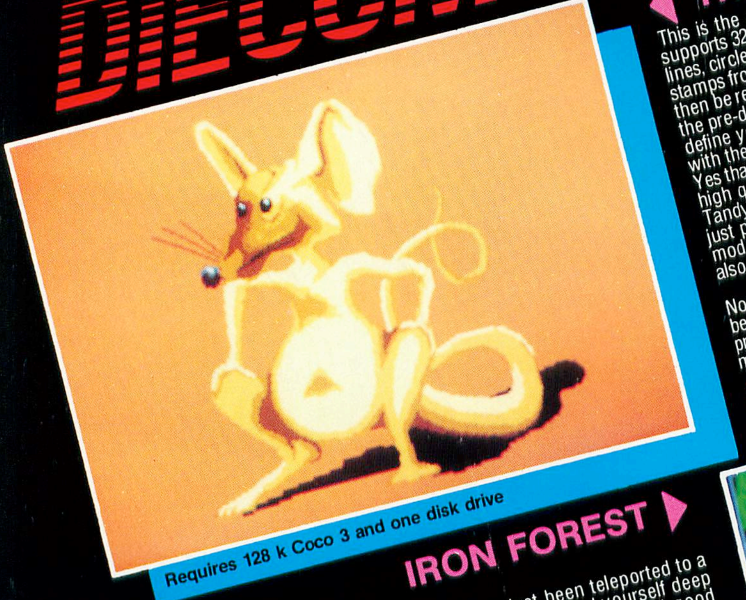

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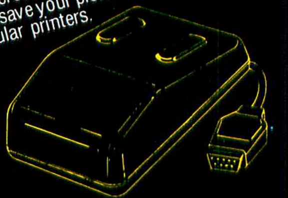

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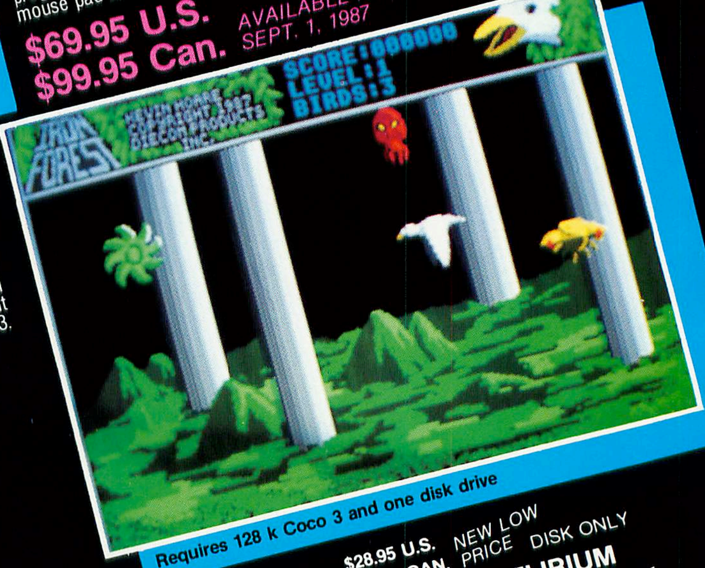

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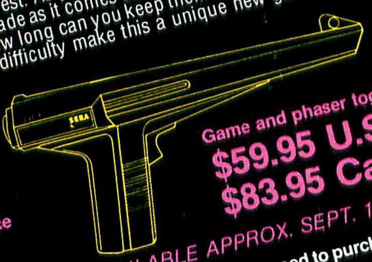

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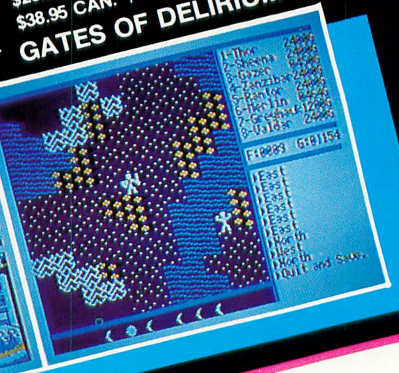

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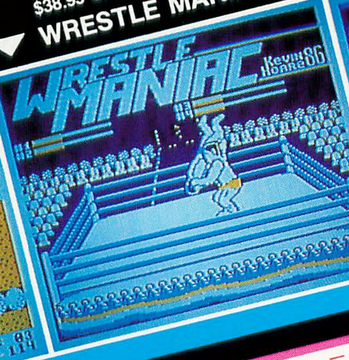

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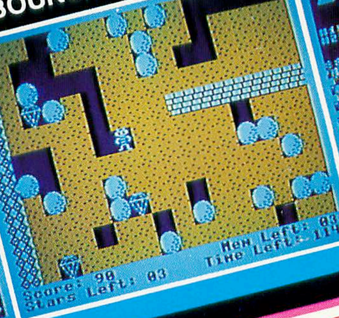

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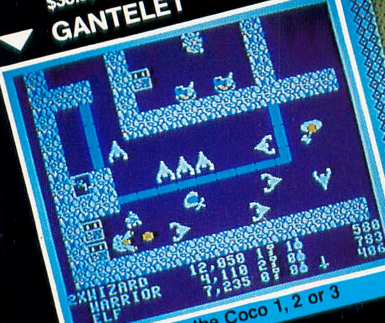

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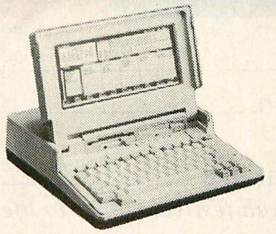

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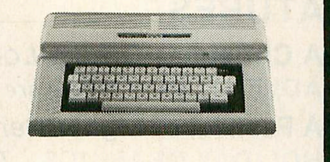

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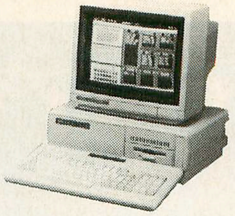

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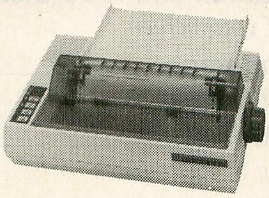

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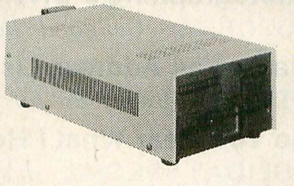

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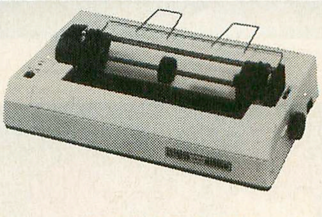

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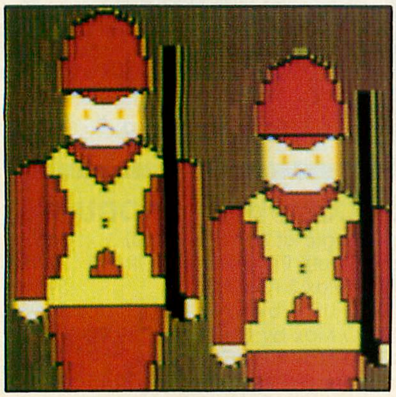

100

116

FEATURES

A Christmas Dream/*Lonni Wilson* 20
ADVENTURE *Where are the toys?*

A Festival of Lights/*Renard DellaFave* 28
HOLIDAY GRAPHICS *The Hanukkah festival comes to life*

Secret Filenames/*Bill Bernico* 38
UTILITY *Keep your files secure*

Keep Your Memories in Order/*Donald Turowski* 46
HOME HELP *Photo label generator*

Photographing a CRT/*Marty Goodman and Fred Cisin* 58
TUTORIAL *Get good "hard copies" of your screen*

Making an Address List/*G.F. Saunderson* 66
UTILITY *A database for your holiday mailings*

Do You Hear What I Hear?/*John Mosley* 86
HOLIDAY SPECIAL *It's CoCo singing in four voices*

That's Entertainment/*Randy Mayfield* 92
ORGANIZATION *CoCo keeps track of your VCR tapes*

A Christmas Potpourri/*Ruth Golias* 100
HOLIDAY MUSIC/GRAPHICS *A sound and graphics treat*

A Stitch in Time/*Larry Anderson* 108
GRAPHICS *Cross-stitching CoCo style*

Customizing Your Keyboard/*Allen Drennan* 116
TUTORIAL *Redefine your keyboard keys*

Pak to Disk Transfer/*David Dawson* 152
UTILITY *Transfer your Pak programs to disk*

Galileo and the CoCo/*Debbie and Dennis H. Weide* 160
HARDWARE PROJECT *Prove Aristotle wrong*

NOVICES NICHE

Christmas Star 70
Don Shortt and M.G. Duncan

Holiday Wreath 72
Mark Bell

Rainbow Colors 74
Patrick Benway

Number Conversion 74
Dick Purnell

I/O Error Free 75
Bohdan Hrycaj

Wipeout Prevention 76
Mike Speer

Stitch-Nichery 76
George R. Furman

CoCo Concoctions 77
David Allen

On the Gridiron 78
Jeff Remick

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ad on Page 158.

NEXT MONTH: Ring in the new year with THE RAINBOW's Beginners Issue! If you are new to computing, we'll teach you the ins and outs of getting the most from your Color Computer. Discover handy hints and tips, and learn to use commands with confidence — get a handle on those peeks and pokes. For all of you old-timers, we'll have our usual store of features, utilities, Q & A columns and more. THE RAINBOW is your source of information for the CoCo 1, 2 or 3, whether you're a novice or an experienced user. Start 1988 right!

COLUMNS

BASIC Training/*Joseph Kolar* — 144
Generating foreign characters

Building December's Rainbow/*Staff* — 16
Holiday greetings

CoCo Consultations/*Marty Goodman* — 82
Just what the doctor ordered

Delphi Bureau/*Cray Augsburg* — 121
Command alterations and Hutchison's database report

Doctor ASCII/*Richard Esposito* — 124
The question fixer

Education Notes/*Steve Blyn* — 98
Experimentation in electricity

PRINT#-2,/*Jim Reed* — 12
Executive Editor's notes

Turn of the Screw/*Tony DiStefano* — 156
Finishing the printer adapter

Wishing Well/*Fred Scerbo* — 52
Understanding road safety

RAINBOWTECH

Barden's Buffer/*William Barden, Jr.* — 172
Exploring Tandy printer features

KISSable OS-9/*Dale L. Puckett* — 180
Putting data structures on the drawing board

OS-9 Programming/*Peter Dibble* — 168
Saving and restoring graphic screens

PRODUCT REVIEWS

Caladuril Flame of Light/*Diecom Products, Inc.* — 135
CBASIC III/*Cer-Comp* — 136
CoCo Checkbook/*Bob's Software* — 134
CoCo Disk Zapper/*Microcom Software* — 131
CoCo Max II Patch/*Spectrum Projects* — 136
Deskmate 3/*Tandy Corporation* — 129
Inventory Manager/*Forrest Enterprises* — 132
MLBASIC/*Wasatchware* — 138
Pyramix/*Dr. Preble's Programs* — 132
QuikPro+II/*ICR Futuresoft* — 137
Winnie the Pooh in the Hundred Acre Wood/*Sierra On-Line* — 133

DEPARTMENTS

Advertisers Index — 192
Back Issue Information — 177
CoCo Cat — 150
CoCo Clubs — 148
CoCo Gallery — 18
Corrections — 24
Letters to Rainbow — 6
Maxwell Mouse — 26
One-Liner Contest Information — 189
Pipeline — 120
Racksellers — 190
Rainbow Info — 37
Received & Certified — 139
Scoreboard — 140
Scoreboard Pointers — 142
Submitting Material to Rainbow — 188
Subscription Info — 24

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December 1987 Vol. VII No. 5

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Poring Over Reader Responses

Editor:

In your September "Building a Rainbow" editorial, you were musing over the future direction of the magazine and asked for input from readers. As a research scientist I use various high-powered micro's professionally, so the CoCo at home is mainly for entertainment and self-education.

The main reason for subscribing is the ads. I skim through each new issue looking for new or unique products. The RAINBOW is the only source of information on products not produced or sold by Tandy. Since acquiring my first Color Computer in 1980, I have spent over $13,000 on CoCos and peripheral products. This figure is accurate because I keep detailed records on a database program (*Homebase*) purchased from a magazine ad in the now defunct Color Computer News. Over 90 percent of these purchases were from magazine ads and the rest direct from Tandy.

The second most important service provided by RAINBOW is technical information of the problem-solving kind. This comes mainly from contributing editor departments and occasionally from letters from other subscribers. For example, when I recently purchased OS-9 Level II from one of your advertisers, I was able to patch my startup routine to set the dual disk drives to 6 ms step rates, include a rapid drive turn-off sequence, and install several windowing functions based on tips and examples from "KISSable OS-9." Another recent useful item was information on how to patch the *VIP Writer* disk to work with the CoCo 3, without which I would not be able to write this letter. Using the same technique I was also able to patch *VIP Database* and *VIP Terminal* to work with the CoCo 3. Which leads to the suggestion — why not publish some of the tech tips uploaded to Delphi instead of just reporting on their existence?

Your third major function for me is the publication of utility programs that add to the ease of use and general enjoyment of a home computer. If the program is short, I type directly from the listings; if not, I send for a copy of RAINBOW ON DISK. With few exceptions, programs with listings longer than one or two pages are too tedious to bother with. The one exception that immediately comes to mind is the outstanding multi-color Christmas card printing program that appeared in the December 1984 issue that was worth every agonizing hour spent typing and debugging.

Finally, due to the present availability of good commercial software for the CoCo, the least important function is the publication in print of submitted programs unless they have some unusual or novel feature not otherwise available. This should be left to tape or disk with just a description of purpose and any special operating instructions printed. The "Novices Niche" might be the exception to these comments.

Although my view of RAINBOW may be unique, I doubt it. The Color Computer has been on the market for almost eight years now and the number of experienced users probably far exceeds the number of newcomers. Even with the current dearth of software for CoCo 3, most of us will rely on commercial sources or downloads from CoCo SIGs rather than copy printed programs. So keep the ads coming, even if you have to lower rates and shed staff or increase subscription rates to do so. The future of the Color Computer depends on it.

Kenneth R. Hill
Severna Park, MD

The two following letters were chosen to represent the hundreds of people who have written with a different view regarding the publication of program listings.

Keep the Listings!

Editor:

I read the "Building a Rainbow" article in the September issue, and felt that I should express my opinions. Your statement that listings might be eliminated in favor of RAINBOW ON TAPE or RAINBOW ON DISK greatly worried me that such a thing could even be considered. The main reason I started reading THE RAINBOW was for the listings! I have learned almost everything I know about programming from typing in those listings and modifying them to see what did what and how it did it. Explaining something in an article is fine, but it doesn't even come close to being able to *use* the information directly and see exactly what's going on.

In relation to your concern for novices, you must realize that there are many novices who just don't have the money to buy RAINBOW ON DISK. Indeed, some of them can barely scratch up the price of a subscription. That's why some people choose the Color Computer in the first place . . . it's cheap! The fact that it's also a remarkable computer is a nice bonus.

Three-column listings? Well, what would they look like? I don't know much about magazine format, so all I can say is "try it and see." I'm sure if it's not acceptable to your subscribers you'll hear about it in a hurry!

The only thing that's missing is more technical information on the CoCo 3.

John Murvine
Ebensburg, PA

Rest assured that we have no intention, whatsoever, of eliminating printed listings.

Regarding three column listings: Refer to pages 83 and 154 of last month's issue. To determine whether or not this format is acceptable to readers, we're anxiously awaiting feedback.

11 Out of 12 Ain't Bad

Editor:

In response to your request in the September 1987 "Building a Rainbow": Some things I really like are having the full address together in "Letters to Rainbow," pictures of screens in the reviews, the new design of the reviews section and the new typeface for programs (they're a lot easier to read now).

As far as the topics, I find all of them helpful except for the Business and Finance issue. I expect this to change, however, as I get older (I'm 16½).

I would whole-heartedly like three-column listings if it means more CoCo 3 articles, as there aren't too many right now. Dealing with this, I would not like you skipping listings in THE RAINBOW. If you did

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Richardson, Texas 75080
214/699-7273

this, you would require most of us to get RAINBOW ON TAPE or RAINBOW ON DISK, which would really add to the cost of the magazine. I also feel that this would decrease the learning experience of THE RAINBOW.

Will C. Power
Cotopaxi, CO

Some CoCo Thoughts

Editor:

Being an amateur radio buff, I take an active role in its direction in order to keep its quality and enjoyment at a maximum. So when you asked to hear from your readers I jumped at my letter pad and started to scratch out my comments, which follow:

I subscribed to RAINBOW magazine from its beginning to help get it going and for the great magazine it was. About 14 months ago I let my subscription run out because the price of the subscription rose too fast for me and because of the dedicated issue format i.e., games, education, utilities, etc. At least six issues a year were of no interest to me. So I had six RAINBOWs that I never had any use for — accounting for half of my subscription. That means the remaining six issues cost me twice as much, theoretically $5 per issue. I make this point not in bitterness, but in disappointment.

Like all CoCo nuts, though, I re-enlisted and joined the ranks again after I purchased one of the new CoCo 3s and received a free copy of RAINBOW magazine and realized how much I missed it.

I applaud Jutta Kapfhammer in her new position. Knowing that RAINBOW is now the *only* magazine left for the Color Computer, she still wants feedback to improve RAINBOW for its subscribers.

I would like to see three-column listings of programs, also a greater variety of programs per issue. Some communications programs (not telecommunications) so the amateur population would start using the CoCo for communications instead of the very limited C-64.

I use my computers for several reasons. I use my IBM for writing several newsletters for local clubs and word processing for local legal researchers. My CoCo is used to keep track of statistics for a local softball league and experimental transmissions on the amateur radio bands (not Packet Radio).

Richard T. Meuse
Melrose, MA

Disk Dissertation

Editor:

I have a suggestion for an article that should be of interest to all computer users. The article would be on the care, handling and use of computer disks. Somewhere along the line most of us have seen and digested the knowledge that magnets and cat hairs are not good for disks. For most of us, the instructions end there.

For example, what is the best way to send disks through the mail? RAINBOW uses a thin piece of ordinary styrofoam as a backing. Some commercial programs come in very nice flat vinyl boxes. Is this of value or only to impress the buyer? I have a Canadian friend who wraps his disk in aluminum foil and then a heavy envelope. Two others send disks in ZIP-lock sandwich bags with cardboard as a stiffener. All write "Do not X-ray" on the envelope. Is this because of a magnetic field around the equipment, or is the X-ray itself harmful to disks? Are the mail sorting and ZIP code reading equipment harmful to disks?

What about general storage of disks? Phonograph records are supposed to be kept in a vertical position. Is this true for disks, or can they be stored flat without harm? Is high humidity harmful? Does low humidity and the accompanying static electricity bother disks, or just computers? And, as part of this query, should you ground yourself before handling disks?

Music tapes are supposed to be played at least once a year to lessen the chance of print through. Is there a similar hazard for disks, and should we follow a similar procedure for all our disks? What about the blank disks you buy? I've bought them for 29 cents each in bulk and at $2.50 for a single in a box. I've had no trouble with either. Is one really better than the other?

This is just a sampling of questions. Someone who has the answers or who can do the research could write a very important and interesting article.

Page R. Edmondson
New Brighton, MN

An excellent idea, indeed! Your questions are presently being researched and will be answered in a detailed article scheduled to appear in an early 1988 issue.

BACK TALK

Barden's Blunder?

As a programmer with experience on computers ranging from the TRS-80 Model I to Cray supercomputers plus a variety of languages, I was concerned about the attitudes expressed in William Barden's column "Learning the Lingo" (August, 1987, Page 168). There are three specific assertions of his that I take issue with.

The first is his statement that assembly language is "always the language of choice" for commercial applications. The facts are that this is true only on small microcomputers such as the CoCo 1 and 2. The relative ease of working in higher level languages means that on larger micros, including the Macintosh, IBM PC and the Atari ST, most applications are being written in C and PASCAL. Assembly language is only important where either code size or speed is a priority. With the CoCo 3's enhanced memory, I would expect to see more and more commercial applications written in C, taking advantage of Microware's excellent C compiler.

Second, I take issue with the implication that people should learn one computer language that "suits" them. There is a lot to be learned from any computer language, and my personal conviction is that a person should learn many computer languages, and choose the one best suited for each individual application. Even such relatively esoteric languages such as LISP and FORTH (both of which are available for the Color Computer) teach many important programming ideas, and can be very appropriate for certain tasks.

Finally, I quickly tired of his constant complaining about the lack of systems of the same calibre as *Turbo Pascal* on the Color Computer 3. He should take a closer look at BASIC09. Except for the lack of a full-screen editor, BASIC09 is such a system as he seems to want: it is interactive, has a fast compiler, and is a very complete language. Admittedly, BASIC09 is the only such system available for the Color Computer right now, but he apparently does not remember just how long it was before systems comparable to *Turbo Pascal* were available for BASIC and C on the MS-DOS systems. With the introduction of the Color Computer 3, we now have a first-class computer. It will take time before developers can tap the full potential of this machine.

Tim Koonce
Berkeley, CA

Smile When You Say That

Editor:

I would like to comment on Jay Thomas' letter in Doctor ASCII (July, 1987). I have been a proud owner of a CoCo 2 since 1982, and a CoCo 3 system for six months, and I have been working with different computer systems for six years. Well, Jay, I read that you loved your Atari system and felt that neither the CoCo 2 nor the CoCo 3 are comparable with your Atari XL. I have no idea about which XL system you have, but I wonder if you ever read about the Atari 1200 XL, which was incompatible with itself and finally was killed. If those are the kinds of products that we can expect from Atari Corporation, you are giving very bad advice. Another thing: if you consider the CoCo to be less than "your supercomputer," why do you have it? I have never heard about any "supercomputer" made by Atari.

You said also that the new CoCo 3 is "extremely touchy and is filled with 'bugs'"; I think that you must be a pretty good technician and programmer to know about all of them. You gave a nice list of "bugs" that you have with your CoCo 3. Maybe the problems with the CoCo 3 aren't a "bunch of bugs" but a "bunch of user's mistakes"; my CoCo 3 is all I want in an inexpensive and flexible programmable machine. Again my question: Why do you have your CoCos? Yes, it's a really neat idea to sell them — maybe they are going to appreciative hands and you could then buy your 1040ST.

The CoCos have been in the market since the late 70's, and you are right to say that they don't compete with your Atari XL or ST, because the CoCos are better and still strong and alive. Better software and hardware is developed each day (you know that because you're reading THE RAINBOW).

The last thing I want to share with you is this: if you don't like the stuff, don't use it, as simple as that. I invite you to contact me when you want to sell your CoCo hardware/software. I don't refuse great products.

Carlos M. Santiago
Mayagrig, Puerto Rico

HINTS AND TIPS

Editor:

Without a doubt, Tudor Jones' *Solitaire* program (December 1986, Page 76) is outstanding among the games published by RAINBOW. I noted the suggestions published in the March issue, but I like the letters versus the symbols for easier recognition.

I made a small change, or rather an addition, to the program. It seemed to me that just the "you win" was not enough when winning. Consequently, I added a short musical passage to supplement the "you win" notice. The changes and additions are as follows:

Line 300: Delete the `:GOSUB20:GOTO190` and then insert it at the end of a new Line 305:

```
305 PLAY"L803T2V 31;4;5;8;10;
    L4;04;1;03;12;10;9;8;9;
    L2T2;10;L4T2;8;9;10;11;
    L2T2;12;12;L404;1;03;12;
    10;9;8;9;L2T2;10;L4T2;8;
    9;10;12;L204T2;1":GOSUB
    20:GOTO 190
```

Any other music could be used in place of the short passage I selected. I chose part of *Alley Cat* largely because it was different.

W. Tudor Morris
Middletown, OH

Poking the Pork

Editor:

I have just received the 1987 disk update for the *Pigskin Predictions* program from Federal Hill Software and it runs just fine on the new CoCo 3 and CM-8 monitor, however here are a few suggestions to make it even better.

First of all, you cannot make any big changes to the existing program or it will not load and run properly. To get around this limitation, type in this short loader program and save it to your working disk. It will give you your customized printer poke and change the graphics to your liking. I call mine `PIGS`.

```
10 POKE 150,1 'my system works just
   fine at 9600 baud
20 PALETTE5,0 'changes the light
   blueish color on the main menu
   screen to black
30 PALETTE9,38 'changes the main
   work area screen from green to
   BRONCO orange
40 PALETTE8,9 'changes the main
   work area text from black to
   BRONCO blue
50 RUN"PIGSPRED"
```

Using Page 297 in the CoCo 3 manual as a guide, you can change palette slots 8 and 9 to have your text look like your favorite team's colors. Good luck.

Greg Dorsha
Williston, ND

I/O Fixits

Editor:

In the August 1986 issue, Josh Alkire of Toledo, Ohio, mentioned his I/O problems on long programs. While I still experience this problem from time to time, I have minimized it through the following:

1. Replacing the cassette jacks with a four-pin terminal lug. Soldering the cassette wires to these terminals, then removing the plugs on the cable and screwing them directly to the corresponding terminal.
2. Replacing the cassette's drive belt whenever the occurrence of the I/O errors becomes too frequent.
3. Connecting a toggle switch to shunt the cassette's remote switch wires. With this switch, rewinding or fast forwarding of tapes can be done without unplugging the DIN plug. On tapes which display frequent I/O errors, I usually turn this switch to shunt, press the play button and keep typing `CLOAD` on the keyboard.

Most of the time it works. I usually make a minimum of four sets per program depending on the importance and length of my program.

Ernesto N. Mania
Manila, Philippines

Ask the "Dummies"

Editor:

When writing long BASIC programs that use several subroutines, you may lose track of where these routines are located if you renumber your program. Try this trick to find where the routines can be found. Place

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Word Power 3

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Auto-repeat; Key-Click; Cursor up, down, left, right, beginning of line, end of line, next word, previous word, top of text, end of text; page forward, backward; 4-way scrolling; block copy, move, delete; global search and replace (with wild-card search); line positioning (left, right or center); insert/overstrike modes; delete to beginning/end of line, next/previous word; and tabs. You can also embed printer codes in text to take advantage of underlining, sub/superscript and other printer functions. Define left, right, top and bottom margins, and page length.

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PRINTING

Word Power 3 drives almost any printer (DMP series, EPSON, GEMINI, OKIDATA, etc.). Allows print options such as different baud rates, line spacing, page pause, partial print, multi-line headers/footers, page numbers, page number placement, and right justification. You can also change the values for these print options within the text by using embedded printer option codes.

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"dummy" lines at the very end of your program to call these subroutines, placing a `REM` (or `'`) after the line number for the routine, plus a description of what routine is being called. No matter how many times you renumber your program, these lines will always tell you where your subroutines are.

Another bit of interesting information is that 63999 is the highest line number you can use in BASIC on a CoCo.

Gay Crawford
Olathe, KS

KUDOS

Editor:

I wish to thank THE RAINBOW and your free-lance writers for the help they bring us by giving hints and tips on programming.

A special thanks to Joseph Kolar, Fred Scerbo, Bill Bernico and all the others who contribute to a wonderful magazine.

About two years ago, I bought a 16K CoCo 2, which I thought was only to play games with (until I discovered THE RAINBOW). Then I realized I had a powerful machine in my possession.

Long live RAINBOW. Keep up the good work.

Ernie DiZazzo
Montreal, Quebec

Gimme Gimme Gimmesoft

Editor:

I would just like to take the time to tell you about the excellent service that I received from a company that advertises in THE RAINBOW. I ordered a 512K card from Gimmesoft via Delphi, and I received it in only three days. The documentation with it was excellent and the upgrade works perfectly. The software included with the upgrade is self-explanatory. I would recommend this product and company to everyone looking to upgrade their CoCo 3. Keep up the good work!

William Dodge
(WIZARDRY)
Long Beach, NY

PEN PALS

- I am 12 years old. I have a CoCo 3, FD 501 disk drive, DMP-105 printer and DCM-6 modem. I am looking for pen pals from the United States and Canada.

Al Mendelson
3747 W. Devon
Chicago, IL 60659

- I am a CoCo 3 user with hard drive, CGP-220, OS-9 Level II, and I play music with MIDI synthesizers. I am looking for an American pen pal. I am 27 years old and work in a bank.

Alexandre Maggioni
Montoie 2
1007 Lausanne
Switzerland

- I am 11 years old and looking for a pen pal that lives in California. He or she must like science and be between the ages of 11 and 12.

I have a CoCo 3, FD 501 disk drive, RGB monitor and several other accessories.

Tim Hennon
9539 Prairie Ave. #7
Highland, IN 46322

- Anyone under 21 anywhere who wants a pen pal, please write. I have a CoCo 2 plus a CCR-81 recorder and many games and joysticks. I also love to do music programs on the CoCo. I will answer all letters.

Norman L. Morris, Jr.
7632 S. Shore #2A
Chicago, IL 60649

- For every CoCoist who enjoys playing all types of video games: I am planning on publishing a disk of assorted games-related material which you can be a part of! Write to me to talk about our games and maybe write a game for the rest of the world to see. Let's all become one big CoCo games pen pal club!

Byron Fast
Box 151
Kleefeld, Man.,
Canada R0A 0V0

- I am 14 years old and have a CoCo 2 and 3, two disk drives, Multi-Pak, 300-2400 baud modem, RGB monitor, Speech/Sound Pak, Orchestra-90 and Gemini 10X printer. I am looking for a pen pal from anywhere, especially Yugoslavia.

Robert J. Liveoak
768 S. Dumfries
Detroit, MI 48217

- I am 13 years old and have a 64K ECB CoCo 2, disk drive and DMP-106 printer. I'm looking for a 16-year-old or under pen pal with a similar system.

Mike Kohut
RR 1
Lynden, Ontario
Canada L0R 1T0

- I am 16 years old and I like Adventure games and programming BASIC. I have a dual disk drive, a DMP-105 printer and the CGP plotter. I hope to be getting a modem, and I will answer all replies.

Patrick Cormier
415 Fourth Street
Petrolia, Ontario
Canada

- I am 28 years old, have a CoCo 2, DMP-105 printer, three drives, CCR-81 cassette and modem and I would like to have pen pals from anywhere in the world.

Dennis Gray
3643 S. 6885 W.
West Valley City, UT 84120

- I am looking for pen pals all over the world. I am 16 years old and I love Adventures and arcade games. I am also interested in BASIC, assembly programming and electronics.

Tal Pery
Harakefet 3 Street
Kiron, Israel 55408

- I am starting an international computer pen pal club. Anyone who is interested in joining, please write.

Heather Kingsley
603-2770 Aquitaine Ave.
Mississauga, Ontario
Canada L5N 3K5

- I am 15 years old, own a CoCo 3, CoCo 2, Speech/Sound Pak, cassette recorder and a pair of joysticks. I am looking for pen pals all over the world and am hoping to hear from all you CoCo Canadians.

Randy J. Pekar
Group Box 7, Sitel
Yorkton, Saskatchewan
Canada S3N 2V6

- I am 10 years old and would like a pen pal within a year's range of my age. I have a CoCo 2 (64K), two joysticks, FD-500 disk drive and Panasonic cassette recorder. I have solved *Bedlam*, *Hall of the King*, *The Maze of Moycullen*, and *Success Mansion*. I love "Star Trek." If you want a pen pal, please write me. I'll answer all letters.

Spencer Metcalf
109 Janet Street
Longview, TX 75601

- I would very much like to correspond with any and all CoCo owners everywhere. I feel I'm all alone with my 64K CoCo 2, one disk drive, cassette and DMP-105 printer. I enjoy all types of programs — utilities, Adventures, games, etc. Please write, and dispel these lonely feelings.

Kimberly K. Lindquist
3250 NW Ridgeview Lane
Albany, OR 97321

- I am 13 years old and have a 64K CoCo 2, disk drive, DMP-100 and a joystick. I like all games and will reply to all responses.

Donald G. Hitt
1046 Meadowbrook
Corpus Christi, TX 78412

- I have a 64K CoCo 2 with Extended BASIC, a cassette recorder and joysticks. I will try to answer all replies but would prefer a pen pal from Africa or Asia.

David Smith
Rt. 1 Box 50
Texico, IL 62889

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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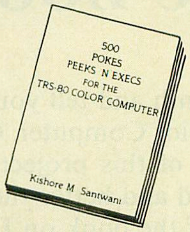
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FOR THE
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Kishore M Santwani

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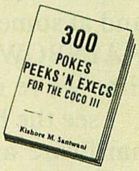
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Got "one for the book"?

Lonnie asked me to sit in for him this month and tell you about the book I'm working on, a history of the Color Computer. Our feeling is that the more people who are aware of this project, the more material will be available and the broader-based and better the book can be. Yet, while casual mention has been made of the book on Delphi, and while I did make several references to it at the CoCo Community Breakfast and at some seminars at our very successful October 9, 10 and 11 Princeton RAINBOWfest, a slice of CoCo history in itself, I believe this is the first time we've mentioned it in THE RAINBOW.

I see the book as very people-oriented, though, of course, the significant hardware and software developments, the milestones, naturally must be noted. The emphasis, though, should be on the people who are a part of the CoCo Community. To bring life to any subject, you relate it through the experiences of those whose lives are intertwined in that activity, the people "who made it happen." Through our many RAINBOWfests, we have had the opportunity to get to know some of the "movers and the shakers" of our CoCo Community. Others we know only by telephone, or Delphi, or perhaps a letter or two.

If this book is to have the breadth and scope we have in mind, though, we must have your help. You see, the city limits of our CoCo Community extend well beyond Prospect, Kentucky, and the various RAINBOWfest sites. Yes, though concentrated in the United States and Canada, ours is a global community and English is merely our primary language. Did you ever see one of the Australian editions of THE RAINBOW? Have you ever read a RAINBOW article reprinted in Hungarian? Did you know that there is an edition of *The Complete Rainbow Guide to OS-9* printed in Japanese?

No, the CoCo is not taking over the world, but while we like to think that Prospect and Fort Worth are focal points of CoCo activity, wouldn't it be fun to be able to peek into Tony DiStefano's Canadian workshop, Marty Goodman's California parts drawer, the back room at Speech Systems in Batavia, Illinois, or the monthly Cajun CoCo Club meeting down in Crowley, Louisiana? Club pictures! Wouldn't it be a gas to have group shots of all the CoCo clubs? Did you know there's a club in Beverly Hills as well as South Sioux City, Nebraska? In Hardburly, Kentucky, and Hamburg, West Germany. In Salt Lake City, but also in Hobart, Tasmania. In seven provinces of Canada, and even the Netherlands and Mexico. You'd figure on one in East Peoria, but how about Netanya, Israel!

Wouldn't it be terrific if pictures and capsule reports and anecdotal material for the CoCo history book poured in from all points of the CoCo Community? Can it be that the same avid interest that brings them out

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for Cincinnati's CINTUG meetings is also the driving force for CoCo Club activities in the coastal town of Piura, Peru, in the shadow of the Andes Mountains? I wonder how Dale Puckett's computer setup in Rockville, Maryland, compares with David Ardila's in Bogota, Colombia.

Have you helped make CoCo history? Want to be in the book? Well, then, take pen (or word processor) in hand and tell us about it. Have you seen a computer setup that just begs to be photographed? Do you know where Captain 80 is now? Perhaps you know a story about Jake Commander. Maybe you have pictures of the editorial offices of Color Computer Magazine, or a shot of the lab at Frank Hogg Laboratory. How about the loading dock at Computer Plus, or the boat dock (?) at Computer Island? I took some shots in the old Fort Worth CoCo factory; maybe you have some pictures of Tandy's present CoCo plant in Korea.

I have visited Dr. Preble and his wife, Dr. Preble, at Dr. Preble's Programs (I think it should be Drs. Preble Programs); maybe you've visited Doctor ASCII or Dr. Plog or Dr. Goodman. Wouldn't it be fun to see photos of the authors of such programs as *Madam Rosa's Massage Parlor, Mega-Bug, Black Sanctum, Telewriter, Dungeon Quest*, or even *Star-DOS*? And, you know there are many stories connected with the development of all the CoCo Classics. Wonder where Tom Mix hangs his ten-gallon hat? You may be the one to fill us in on where the HOT CoCo people are now. Maybe you can report a "first."

History books are full of firsts. For instance, Lee Veal, of Rowlett, Texas, has the first CoCo: Serial #000001, a 4K, nonextended, with a "C" Board. Yes, it works fine. In fact, he just got it a year ago on an "as-is" table in a Fort Worth Radio Shack. Ron Krebs of Mark Data lays claim to having created and marketed the first Color Computer Adventure game, *Calixto Island*. He and his wife wrote it and got the name from a street in their neighborhood in Mission Viejo, California. Dave Lagerquist, who founded *Chromasette* Magazine, appears to be the first to use the term "CoCo" in a publication. Wayne Green was the first to predict the imminent demise of the CoCo — almost six years ago in the January 1982 issue of *80 Microcomputing*! Maybe you know of some firsts we haven't heard about.

Funny stories. Anecdotes. Everybody loves those short, entertaining accounts of personal experience. Does a CoCo club meeting go by without someone telling a CoCo "war story" or two? I'd like to include some of the best anecdotes, with credit lines, in little box inserts scattered throughout the book. And a history book comes alive with pictures of people! Maybe you have a lulu and its publication was "just meant to be."

Yes, we have heard our share of tales, but I'm sure there are some jewels out there just crying to be told. Sometimes a simple phone call yields a memorable story. Other times, a reader with a sense of humor will write in to share a "boner." One of my favorite letters to the editor was from a reader who recalled someone writing in RAINBOW that nothing entered through the keyboard would ever damage the computer. He said he accepted that until he "entered a full glass of lemonade through the keyboard and it *did* cause problems."

Father Bill Fleener, the Old Father William of Color Computer News, has a funny story about him and his wife deciding to sell the family piano in order to buy a Color Computer. Peter Stark likes to tell about having to change the name of his Star-Kits company, "because everyone kept asking for Charlie the Tuna!" Dan Downard has a new story every time he drops by my office. A few of his are about me, but I have some doozies about him, as well. We both have "Lonnie stories" to throw in the pot. Our CoCo history book is a case in which the more cooks, the better the broth.

If the foregoing has not reminded you of some quotable quote or personal glimpse into your own CoCo experience, maybe you'll just have to wait for the book to come out, but if there's a stir in your memory, a recollection of a cute story of life and people in our CoCo Community, a snapshot stuck away in a drawer, a personal perspective on significant CoCo turning points such as events in the development of new products and publications, then I invite you to help me write the book!

— Jim Reed

One-Liner Contest Winner . . .

Here is a quick and easy method of achieving a `PCLEAR0` on your Color Computer. If you have Extended BASIC 1.0 or any problem with the `PCLEAR1` used in the program, you will need to set it up as follows:

```
10 GOTO 63000
20 start your program here
 .
 .
 .
63000 insert PCLEAR0 routine here followed by
      GOTO 20
```

The listing:

```
10 POKE182,0:POKE183,PEEK(188):P
OKE184,0:POKE185,16:POKE186,PEEK
(188):POKE187,0:POKE188,PEEK(188
-6):PCLEAR1:POKE183,PEEK(183+6):
POKE188,PEEK(188+6)
```

Vernon Nemitz
Virginia Beach, VA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

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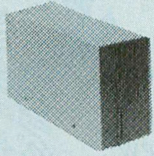

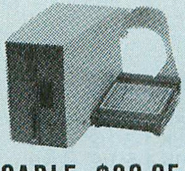

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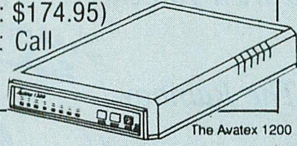

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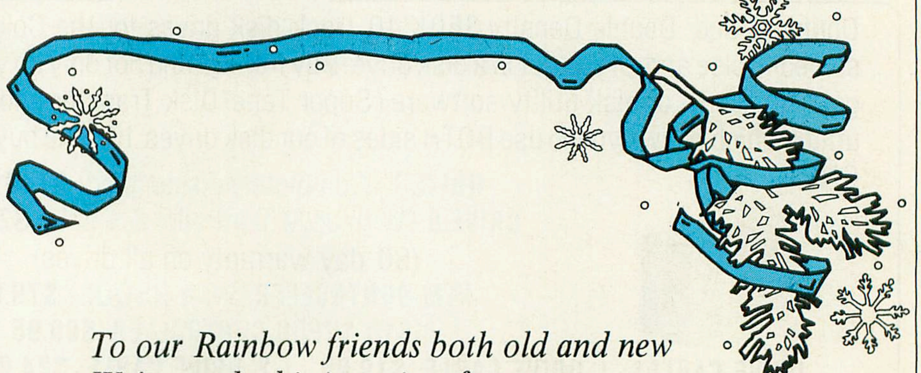

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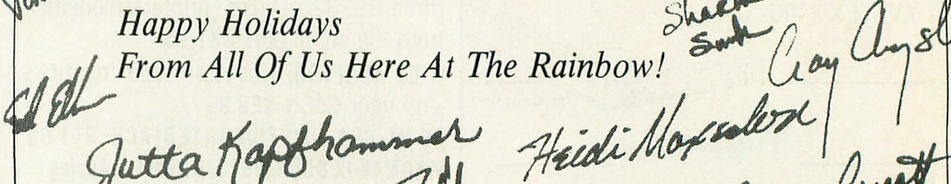

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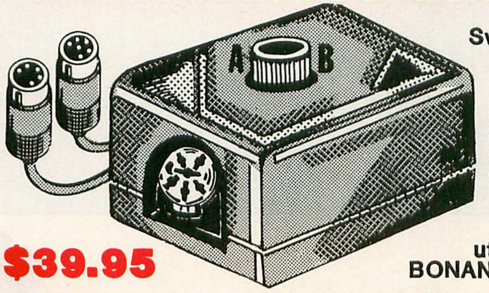

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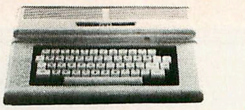

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Did you buy an expensive RGB monitor (CM-8) just so that you could see your Hi-Res artifacting CoCo 2 games in BLACK & WHITE ??? RGB PATCH converts most games to display in COLOR on an RGB monitor. 128K DISK **$29.95**

COCO NEWSROOM – 22 FONTS & 50 PICTURES !

Compose your own "CoCo NEWSPAPER" w/BANNER HEADLINES & 6 ARTICLES using a SOPHISTICATED graphics editor with importing of PICTURES, FONTS & FILL PATTERNS from disk. Over 140K of code & WYSIWYG! CoCoIII DISK **$49.95**

MAGNAVOX 8515 ($299.95*) LOWEST PRICES

Sharper & Brighter than Tandy CM-8!

Do NOT be FOOLED! The CM-8 has a dot-pitch of .52mm & will not work with any other computer or VCR! The '8515' has a SHARP .42mm dot-pitch, will work with IBM PCs/Tandy 1000 and its COLOR COMPOSITE input displays PMODE4 artifact colors unlike the CM-8! ***$299.95** when purchased with a **$24.95** CoCoIII cable - Add **$14** shipping.

CoCo III 512K RAM sticker **$4.99**
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Level II Basic09 binder ..**$9.95**

300 CoCoIII POKES **$19.95**
CoCoIII MultiPak PAL chip .**$19.95**
Guide to CoCoIII Graphics .**$21.95**

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FASTDUPE 512 Format & Backup up to 4 single- /double-sided, 35/40 trk disks in 1 PASS! Even OS9 Lev.II! **$19.95**
BIG BUFFER - 437,888 byte spooler for a 512K CoCoIII! Print up to 200 text pages while using your CoCo! **$19.95**

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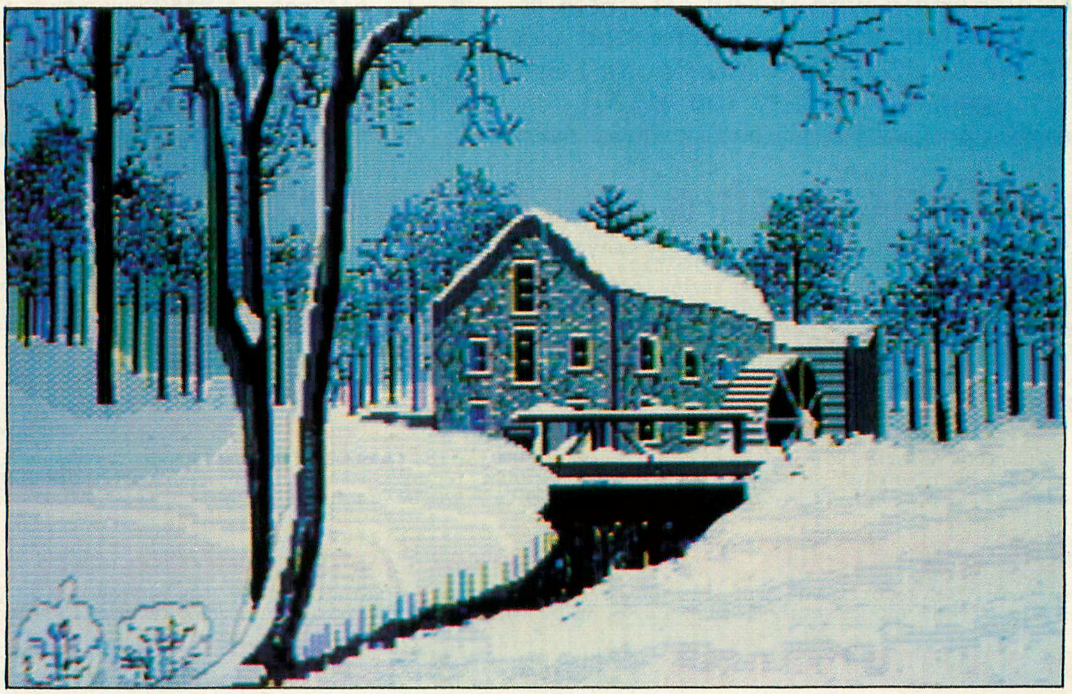
See our other ads on pages 25 & 27

CoCo Gallery

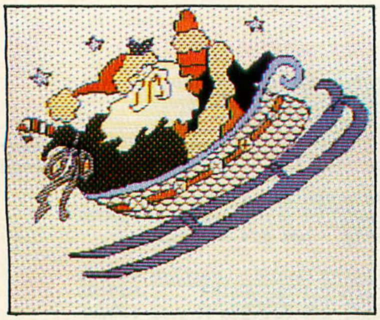


1st CoCo 3

Mill **John Murvine**

John, of Ebensburg, Pennsylvania, used a utility he wrote to enrich the gallery with this winter scene portraying the Wayside Inn Grist Mill located in South Sudbury, Massachusetts.

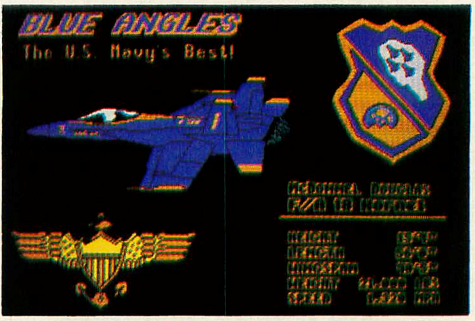
Honorable Mention



Santa **Claire Beaupre**

Color Designer and *CoCo Max* were used to create this seasonal representation of the famous man. Claire is a laboratory technologist of clinical chemistry in Montreal, Quebec.

3rd

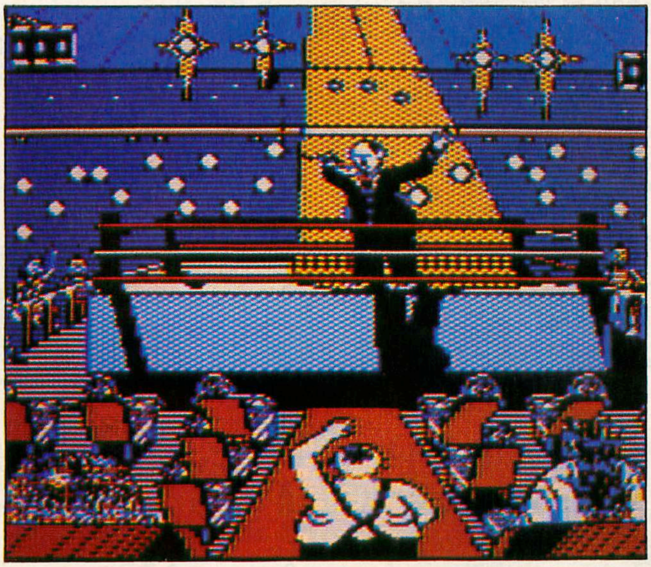


Blue Angels **John Owens**

John was inspired to produce this artwork when he saw the famous Blue Angels perform in Rome, New York. He used *Color Max 3*.

1st

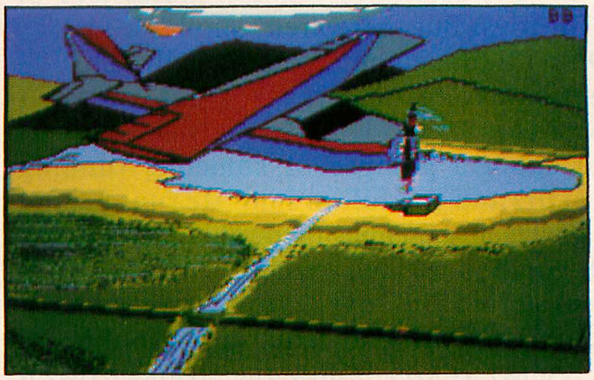
CoCo 1 & 2



Wrestle **Barry O'Brien**

This detailed illustration of the moments before a wrestling match was produced with *CoCo Max*. Barry lives and attends school in St. John's, Newfoundland. He enjoys drawing on his Color Computer.

2nd



Airplane **Brad Bansner**

This image of a single engine airplane flying in the mountains was generated with *Color Max 3*. Brad is a sophomore in high school and lives in Wyomissing, Pennsylvania.

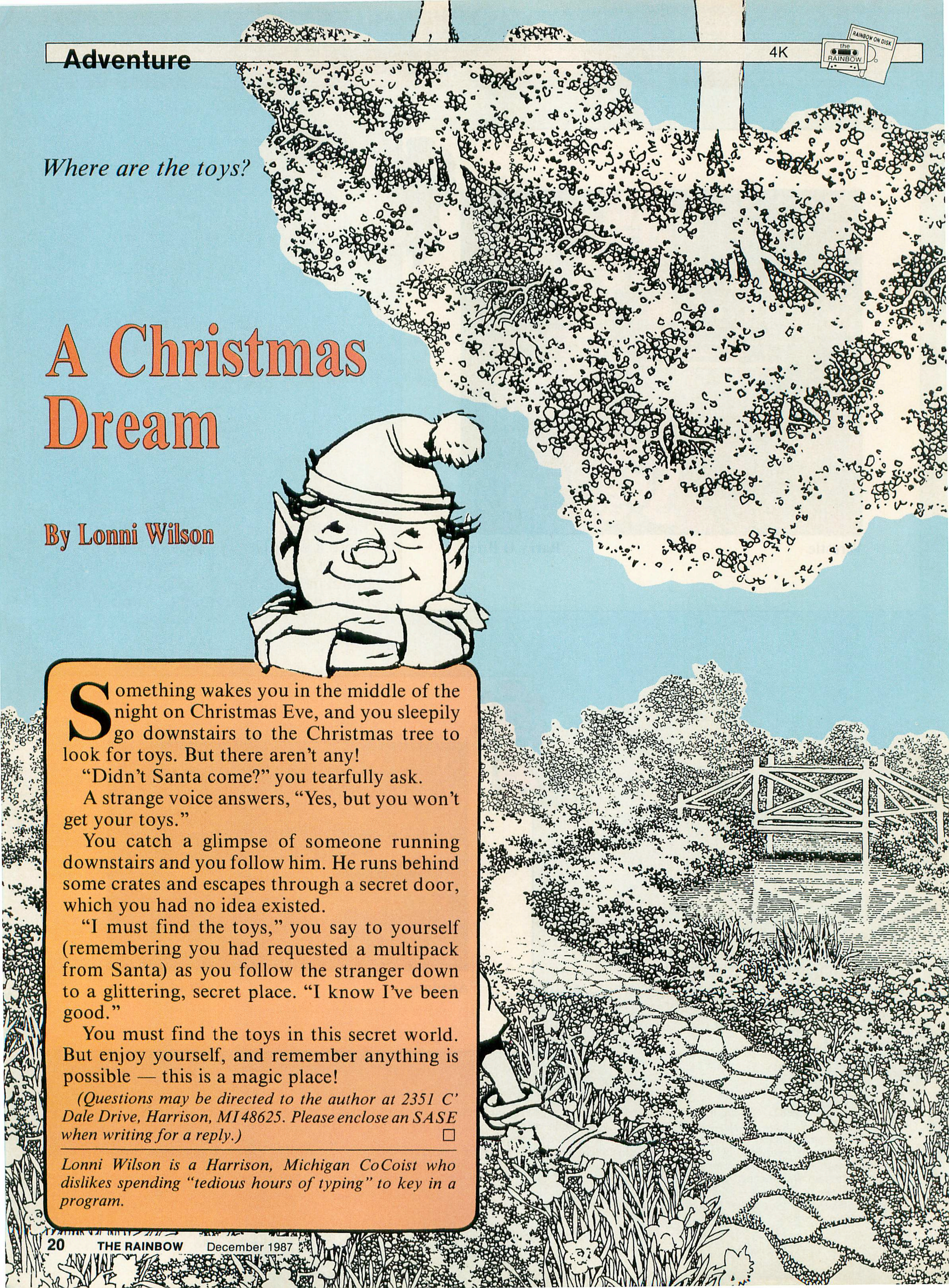
SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator



Where are the toys?

A Christmas Dream

By Lonni Wilson

Something wakes you in the middle of the night on Christmas Eve, and you sleepily go downstairs to the Christmas tree to look for toys. But there aren't any!

"Didn't Santa come?" you tearfully ask.

A strange voice answers, "Yes, but you won't get your toys."

You catch a glimpse of someone running downstairs and you follow him. He runs behind some crates and escapes through a secret door, which you had no idea existed.

"I must find the toys," you say to yourself (remembering you had requested a multipack from Santa) as you follow the stranger down to a glittering, secret place. "I know I've been good."

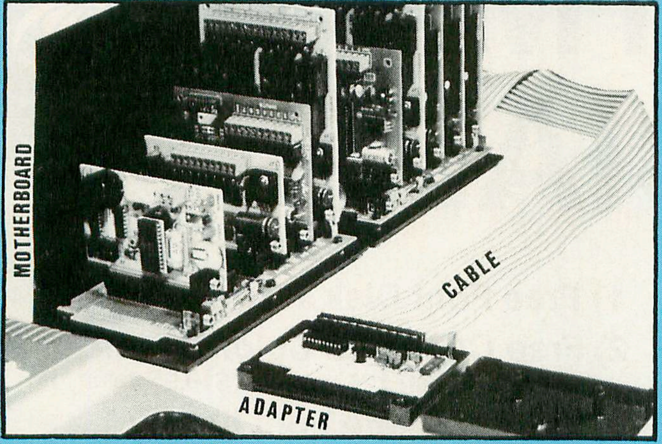
You must find the toys in this secret world. But enjoy yourself, and remember anything is possible — this is a magic place!

(Questions may be directed to the author at 2351 C' Dale Drive, Harrison, MI 48625. Please enclose an SASE when writing for a reply.) □

Lonni Wilson is a Harrison, Michigan CoCoist who dislikes spending "tedious hours of typing" to key in a program.

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card **RE-140: $129**

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card **RE-156: $99**

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card **AD-142: $129**

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter **AN-146: $139**

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card **IN-141: $59**

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O **DG-148: $65**

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm **CL-144: $89**

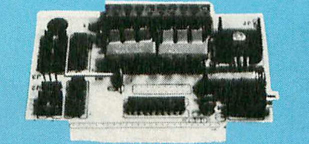
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder **PH-145: $79**

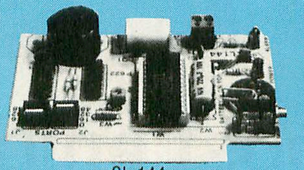
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

A-BUS Prototyping Card **PR-152: $15**

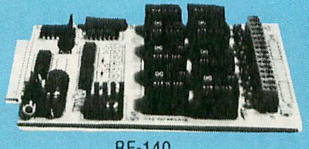
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s



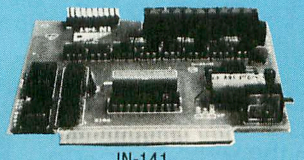
ST-143



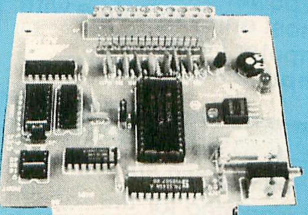
CL-144



RE-140



IN-141



AD-142

Smart Stepper Controller **SC-149: $299**

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option **RC-121: $49**
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option **PD-123: $89**
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option **BB-122: $19**
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver **ST-143: $79**

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors **MO-103: $15 or 4 for $39**

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus".	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot. Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) **CA-163: $24**

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: **CA-162: $34**

A-BUS Motherboard **MB-120: $99**

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT & NY residents add sales tax.
C.O.D. add $3.00 extra.
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CHRISTMAS SPECIAL

Good through
January 31, 1987

FREE DEMO DISK AND COCOSHOW PROGRAM + **Your choice of:**

1) **Free Font Disk** a $24.95 value
2) **Free CGP–220 Color Driver** the world's best: 125 colors a $19.95 value
3) **The complete Font library (4 disks) for only $29.95** (a $99 value)

When you order CoCo Max III. Only $79.95 including the deluxe hi–res interface.

CoCo Max™ III

must be the most enjoyable, useful, and awesome program you've ever seen or your money back. Instantly, no questions asked.

CALL NOW TOLL FREE 1–800 221 Mon–Fri 9 to 5 EST **AND LET THE FUN BEGIN**

A FEW QUOTES :

An outstanding program that almost turns your CoCo into a replica of the Macintosh. Terrific hi-res color, very easy to learn and use.
- Family Computing

There is absolutely nothing else on the Color Computer that is comparable to CoCo Max's power and ease of use. The most enjoyable time with a computer I ever had.
- Computerware Review

In Everyone's book, CoCo Max is rated again and again as the most incredible product ever marketed for the CoCo.
–CoCo America Club

I never expected to see anything like it on my CoCo screen. There isn't a single command to remember. Even a person who has no drawing ability like myself can create a presentable picture. I've spent hours just doodling enjoying all the things from silly to the serious. Fascinating experience. Buy it, you won't be sorry.
- 6809 Express

Note: There is only one *CoCo Max III*. Do not confuse **COLORWARE**'s *CoCo Max* with similar sounding imitations.

INTRODUCING THE NEXT GENERATION: CoCo Max™ III*

More Resolution · More Power · More Color · Built-in Animation · More Speed · More Type Styles · More Tools · Amazing Color Sequencing

"The best program ever written for the Color Computer"

That's how thousands of enthusiastic users rated the **CoCo Max II** drawing program. With **CoCo Max III** we are ready to amaze them again. Instead of "patching" CoCo Max II, we rewrote it from scratch to take advantage of the CoCo Max III hardware. The results will knock your socks off! Below is a brief list of some of the *new* features, but some, such as **animation, color sequencing**, or the **slide show**, have to be seen. Send for the Demo Disk, and see for yourself.

Everybody's favorite drawing package features:
- A 50% larger editing window. - Zoom area **400%** larger. - New drawing tools: **rays, 3D cubes, arcs,...** - New editing tools: shadow, text size,... - Rotate by 1.5° steps - Select any 16 of the 64 possible colors (all 64 colors displayed at once!) - Powerful **color mix**: additive, subtractive, overlay,... - Full **color editing** of patterns and color changing patterns. - Incredible **special effects** with **color cycling** up to 8 colors with variable speed. -**Animation** adds the dimension of motion to your image. (Must be seen.) - Sophisticated data compression saves up to 70% of disk space when saving pictures.
In addition, there are dozens of enhancements to the multitude of features that made CoCo Max II a best seller.

More about CoCo Max III
- CoCo Max III is not an upgrade of CoCo Max II. It is entirely rewritten to take advantage of the new CoCo 3 hardware (More memory, resolution, colors, speed,...)
- The new CoCo Max III **Hi-Res Interface** and the CoCo Max II **Hi-Res Pack** are *not* interchangable.
- The new interface plugs into the joystick connector.
- The CoCo Max III disk is not copy protected.
- CoCo Max III only works with the CoCo 3.
- A Y-Cable or Multi-pak is not necessary.
- Colors are printed in five shades of gray.
- CoCo Max III can read CoCo Max II pictures.

Note: CoCo Max II (for the CoCo 2) is still available on disk ($79.95). CoCo Max I is still available on tape ($69.95). For details, refer to our double page ad in any *Rainbow* from January '86 to July '87

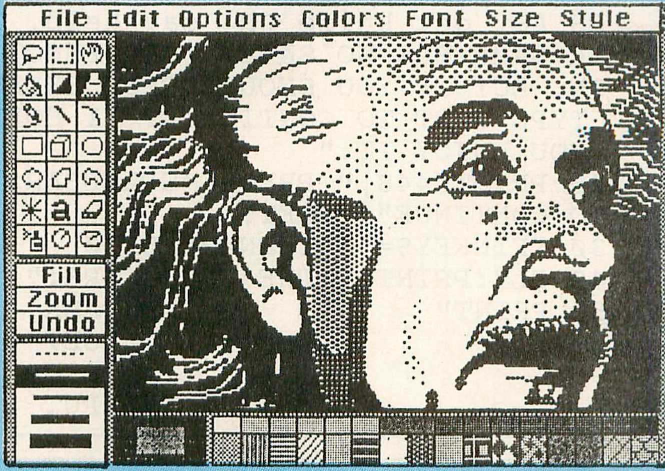
Toll Free operators are for orders only. If you need precise answers, call the **tech line**. (Detailled CoCo Max specs are included with the Demo Disk.)

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

Technical info:	(203) 656-1806
Orders only Except in CT	800 221-0916
Connecticut orders:	(203) 348-9436

All lines open weekdays 9 to 5 Eastern time

* Beware of inferior imitations that *DO NOT* include a Hi-Res Interface or charge extra for each utility.



Imagine this picture in sixteen colors!

Guaranteed Satisfaction
Use CoCo Max for a full month.
If you are not delighted with it,
we will refund every penny.

System Requirements:
Any CoCo 3 disk system with a Joystick or a Mouse.

We apologize to tape users, CoCo Max III needs the flexibility of a disk.

The **CoCo Max III** system includes: ● The special Hi-Res interface (for your mouse or joystick) ● The CoCo Max III disk ● Many utilities: (To convert Max II pictures, Max colors, etc.) ● A detailled User's Manual. Complete system; nothing else to buy. **CoCo Max III: $79.95***

WITH COUPON ONLY

FREE DEMO DISK

Name ____________________

Street ____________________

City ____________________

State Zip ____________________

Printer used: ____________________

Please include $2 to help defray Processing and Shipping costs. (Check, Money Order, etc. Sorry, no COD or Credit Cards). Coupon (or copy) must be mailled to:

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```
110 ......219  550 .......18
250 ......170  END .....143
400 .......90
```

The listing: `DREAM`

```
0 CLS:PRINT"  IN THIS ADVENTURE,
 YOU MUST   FIND THE STOLEN CHRI
STMAS TOYS, WHICH ARE HIDDEN IN
A MAGIC     WORLD, AND RETURN TH
EM TO YOUR  HOUSE."
10 PRINT:PRINT:PRINT"  THIS ADVE
NTURE USES TWO WORD  COMMANDS SU
CH AS, get knife OR  say help. T
HE GAME HAS NO SAVE/ LOAD FUNCTI
ON, BUT IF YOU SHOULDPRESS BREAK
 TYPE CONT TO CONTIN-UE.  I HOPE
 YOU ENJOY IT."
20 PRINT@448," PRESS <SPACEBAR>
TO CONTINUE";INKEY$
30 IFINKEY$=" "THEN40ELSE30
40 CLS:PRINT"  THE VERBS ARE:"
50 PRINT"                   ASK
                            GET
                            DROP
                            PUT
                            USE
                            EAT
                            SAY"
60 PRINT"                   LOOK
                            PULL":
PRINT@448," PRESS <SPACEBAR> TO
CONTINUE";INKEY$
70 IFINKEY$=" "THEN80ELSE70
80 CLS
90 DIM A$(8),B$(8),C$(8):L=1
100 DATA IN THE ENTRANCE TO THIS
 ENCHANTING WORLD,MAGIC KNIFE,WE
ST
110 DATA IN THE UPSIDE DOWN
 FOREST,UPSIDE DOWN TREES,NORTH
EAST
120 DATA IN A COURTYARD,A BEAUTI
FUL FOUNTAIN,NORTH NORTHEAST
  SOUTH WEST
130 DATA AT A POND,PINK WATER,SO
UTHWEST
140 DATA IN FRONT OF A LARGE
 STONE,STONE,SOUTH
150 DATA IN A FRUIT ORCHARD,FRUI
T,NORTH EAST
160 DATA IN FRONT OF AN ELF,ELF,
SOUTH
170 DATA IN A SMALL SHACK,GIFTS,
```

Corrections

"Gift Buyer's Guide" (November 1987, Page 57): The price for Spectrum Projects' CoCo Keyboard Extender Cable was incorrectly stated as being $19.95. The actual price is $39.95.

"A Desktop Publisher on a Shoestring" (October 1987, Page 58): Author H. Allen Curtis has written to indicate some minor errors in the article. First, in the rightmost column on Page 62, the user is told to "Change Line 35 to:". This should actually read "Insert Line 35" since that line did not already exist. Just below that, in the fifth line of Line 35, you should change `T0` to `TO`. Finally, in Line 205 of Listing 1, a value of &24 was given. This should read &H24. However, this doesn't have any effect on program execution.

"CoCoDraw Update" (October 1987, Page 98): In the rightmost column of Page 98, Line 11 is missing a parenthesis. In that line, just after the value of 50, should be two parentheses, so that section should read `N/50))` instead of `N/50)`.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` at the CoCo SIG> prompt and `INFO` at the TOPIC> prompt.

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Printer/Modem 10' Extender Cable $14.95
TANDY CM-8 RGB Analog 6'Video Ext Cable $19.95
Disk Drive Cable (34pin - 34pin) $19.95
Cassette 'Y' Cable - Connect a 26-3028 Hi-Res Joystick interface & Tape Recorder to CoCoIII .$19.95
Modem Cable - 6ft (DB25-DB25) $19.95
Joystick/Mouse 10' Ext Cable $19.95
No more Deluxe RS-232 paks left to hook up ptr & modem? Buy our RS-232 "Y" Cable (4 pin) $24.95
Dual Disk Drive Cable (3-34pin) $24.95
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Other Analog RGB monitor cable (Specify!) ..$39.95
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"D" Rev motherboard w/o socketed chips $16.95
Video Clear - This cable will reduce TV interference created by CoCo! $19.95
Warp Fighter 3-D - A CoCo III Space Fighter game with "3-D GLASSES"! By Steve Bjork! $39.95
CoCo III keyboard - upgrade your CoCo II keyboard! "Package" deal w/FKEYS III($24.95) software $39.95
HDS Controller w/1.1 ROM (SAVE$20) $79.95
MAGNAVOX TV tuner - Now you can watch TV with your Magnavox 8505/8515 RGB Analog monitor! $99.95
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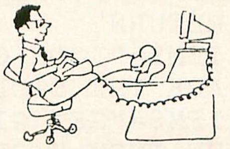

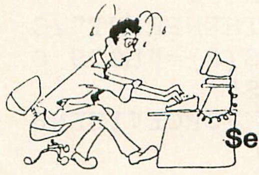

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```
NOWHERE!  use THE   force LUKE!
180 FORI=1TO8
190 READ A$(I),B$(I),C$(I)
200 NEXT
210 PRINT"YOU ARE:";A$(L)
220 PRINT"YOU SEE:";B$(L)
230 PRINT"YOU CAN GO:";C$(L)
240 INPUT"WHAT DO YOU WISH FOR";
M$
250 ON L GOSUB 270,330,400,470,5
10,550,610,650
260 FORX=1TO1500:NEXTX:CLS:GOTO2
10
270 IFM$="GET KNIFE"THENPRINT"OK
AY, YOU HAVE IT.":KNIFE=1:B$(1)=
"A RAINBOW...THE RAINBOW"
280 IFM$="LOOK KNIFE"THENPRINT"I
T IS SHAPED WEIRD."
290 IFM$="GET RAINBOW"THENPRINT"
YOU HAVE IT.":B$(1)="LOTS OF INT
ERESTING     THINGS."
300 IFM$="LOOK RAINBOW"THENPRINT
"IT IS MADE UP OF RAINBOW MAGA-
 ZINES."
310 IFM$="W"THENL=2
320 RETURN
330 IFM$="LOOK TREES"THENPRINT"T
HE limbS ARE SHAPED FUNNY.":B$(2
)="UPSIDE DOWN TREES   FUNNY limb
S"
340 IFM$="PULL LIMB"THENPRINT"YO
U HERE A NOISE IN THE DISTANCE":
LIMB=1
350 IFM$="LOOK LIMB"THENPRINT"IT
'S FUNNY, OKAY?"
360 IFM$="N"THENL=3
370 IFM$="E"THENL=1
380 IFKNIFE=2ANDLIMB=1ANDRAIN=1A
NDM$="SAY GIFT"THENL=8
390 RETURN
400 IFM$="LOOK FOUNTAIN"THENPRIN
T"THE WATER IS A RAINBOW OF COLO
RS"
410 IFM$="GET FOUNTAIN"THENPRINT
"DON'T TAKE ALL THE BEAUTY AWAY.
"
420 IFM$="N"THENL=5
430 IFM$="NE"THENL=4
440 IFM$="W"THENL=6
450 IFM$="S"THENL=2
460 RETURN
470 IFM$="LOOK POND"THENPRINT"A
RAINBOW WOULD LOOK BEATIFUL   HE
RE!"
480 IFM$="DROP RAINBOW"THENPRINT
"YOU HEAR ANOTHER SOUND IN THE
 DISTANCE":RAIN=1:B$(4)="RAINBOW
 OVER POND"
490 IFM$="SW"THENL=3
500 RETURN
510 IFM$="LOOK STONE"THENPRINT"T
HERE IS A SLOT IN IT."
520 IFM$="PUT KNIFE"ANDKNIFE=1TH
ENINPUT"WHERE";DD$:IFDD$="STONE"
THENPRINT"YOU HEAR A THIRD SOUND
 IN THE   DISTANCE!":KNIFE=2:B$(
5)="KNIFE IN STONE"
530 IFM$="S"THENL=3
540 RETURN
550 IFM$="LOOK ORCHARD"THENPRINT
"IT IS FILLED WITH FRUIT TREES."
560 IFM$="GET FRUIT"THENPRINT"OK
AY, YOU HAVE IT.":FRU=1
570 IFFRU=1ANDM$="EAT FRUIT"THEN
PRINT"THEN FRUIT POISONED YOU, B
ECAUSEYOU WERE NOT USED TO IT."
580 IFM$="N"THENL=7
590 IFM$="E"THENL=3
600 RETURN
610 IFM$="ASK ELF"THENPRINT"IF Y
E EQUALS THREE               AND
SOUND IS AROUND             THEN
 SAY GIFT                   IN T
HE UPSIDE DOWN FOREST.":FORX=1TO
5000:NEXTX
620 IFM$="LOOK ELF"THENPRINT"HE
IS A CRISTMAS ELF."
630 IFM$="S"THENL=6
640 RETURN
650 IFM$="LOOK GIFTS"THENPRINT"T
HEY ARE THE STOLEN ONES."
660 IFM$="GET GIFTS"THENPRINT"YO
U HAVE THEM.":GF=1:B$(8)="LOTS O
F INTERESTING  THINGS"
670 IFGF=1ANDM$="USE FORCE"THEN6
90
680 RETURN
690 CLS:PRINT"  YOU DID IT!  YOU
 RETURNED THE GIFTS NOT ONLY TO
YOUR HOUSE BUTTO EVERY HOUSE.  Y
OU MADE      CHRISTMAS A REAL C
HRISTMAS!":END
```

Mouse Tales By Logan Ward

MAXWELL MOUSE
WHEW, IT SURE IS ALOT OF WORK PULLING DOWN ALL OF SANTA'S LISTS ! ! !
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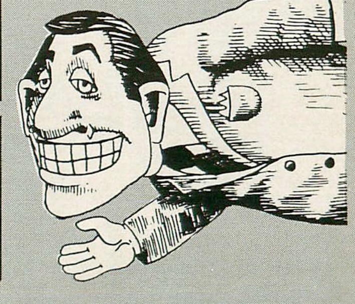

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A Festival of Lights

By Renard DellaFave

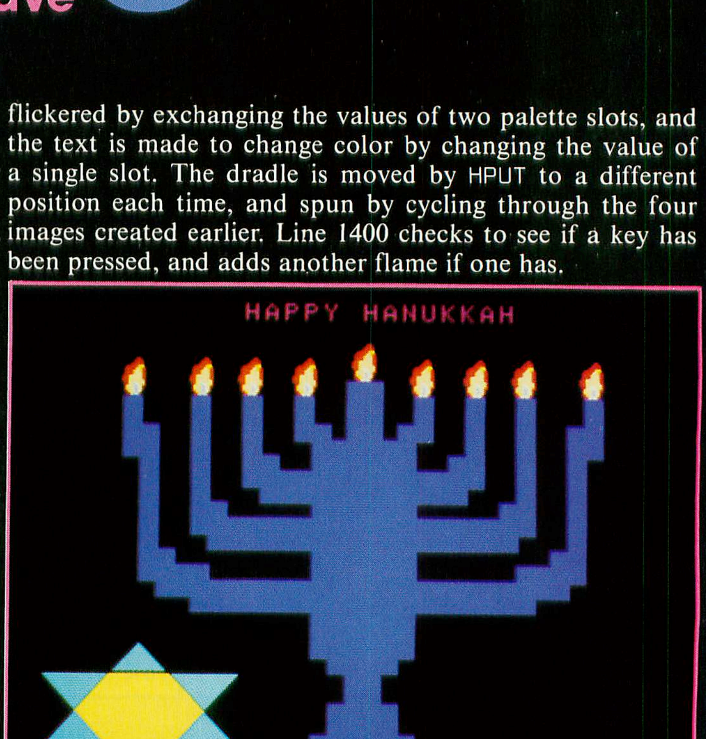
Hanukkah brings the brilliance of CoCo 3 graphics together with the Hanukkah festival of lights, and also demonstrates animation techniques for use on the CoCo 3.

Hanukkah draws a menorah, dradle, and a Star of David on the screen; the flame on the menorah flickers and the dradle spins and moves. For each tap of a key another flame is added to the menorah, in the traditional order of right-to-left.

Both the flame and the dradle are literally scanned onto the screen from `DATA` statements, which makes it very easy to modify their shapes. The flame, as it is animated by palette switching in Line 1380, is immediately saved into `HGET` buffer #1. The dradle images are first modified using `HLINE` statements to create the four frames that are used in its `HGET/HPUT` animation. Each `HBUFFER` is used before the next one is reserved, due to a bug in CoCo 3's BASIC.

After the dradle and flame have been drawn and put in `HBUFFERS` with the `HGET` command, the screen is cleared and the stationary objects are created. Both the menorah and the Star of David are drawn using `HDRAW` and `HPAINT` commands; the text is put on the screen with `HPRINT`. The center (shamas) and the rightmost flame are then put on the menorah with `HPUT`, and the main loop of the program is entered.

All the action takes place in the main loop. The flames are flickered by exchanging the values of two palette slots, and the text is made to change color by changing the value of a single slot. The dradle is moved by `HPUT` to a different position each time, and spun by cycling through the four images created earlier. Line 1400 checks to see if a key has been pressed, and adds another flame if one has.



Hanukkah is heavily remarked, making it is easier to understand, but these remarks can safely be left out if you want.

(Questions about this program may be directed to the author by calling 919-787-8396.) ☐

Renard DellaFave is a student living in Raleigh, North Carolina, and is a self-taught programmer. Besides computers, he enjoys electronics, books and science.

220	137	1080	146
370	27	1170	62
560	4	1320	169
700	11	1490	150
920	180	END	198

The listing: HANUKKAH

```
1 POKE &HFFD9,0 'SPEED UP CPU TO
 1.78MHZ
2 REM PRESS ANY KEY TO UPDATE
3 REM  MENORAH FOR NEXT DAY
4 REM <(<(<(<(<(!)>)>)>)>)>
5 REM # RENARD  DELLAFAVE #
6 REM #   COPYRIGHT (C)   #
7 REM #       1987        #
8 REM #   VERSION #:2.4   #
9 REM <(<(<(<(<(!)>)>)>)>)>
100 CLS:INPUT"ARE YOU USING A RG
B MONITOR";MN$:IF LEFT$(MN$,1)="
Y" THEN MS=-1
110 MO=MS+1
120 REM NORMALIZE ON <BREAK>
130 ON BRK GOTO 150
140 GOTO 170
150 IF MS=0 THEN PALETTE CMP ELS
E PALETTE RGB
160 CLS:PRINT"****PROGRAM EXIT**
**":POKE 65496,0:END
170 HSCREEN 2
180 HBUFF1,153 'BUFFER FOR FLAME
190 REM SET UP PALETTES
200 DIM B(1),S(1) 'FLAME ANIMATI
ON COLORS FOR EACH MONITOR
210 B(0)=32:B(1)=5:S(0)=52:S(1)=
39
220 DATA 0,12,28,35,42,44,0,63,5
,43,39,5,39,0,0,0
230 FOR CA=0 TO 15:READ CS:PALET
TE CA,CS:NEXT CA
240 IF MS=-1 THEN PALETTE 3,54:P
ALETTE 4,42:PALETTE 5,27:PALETTE
 11,32:PALETTE 12,53
250 REM DRAW AND GET FLAME IMAGE
260 DATA 0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0
270 DATA 0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0
280 DATA 0,0,0,0,0,0,0,0,6,6,0,0
,0,0,0,0
290 DATA 0,0,0,0,0,0,0,6,6,6,6,0
,0,0,0,0
300 DATA 0,0,0,0,0,0,6,6,3,6,6,0
```

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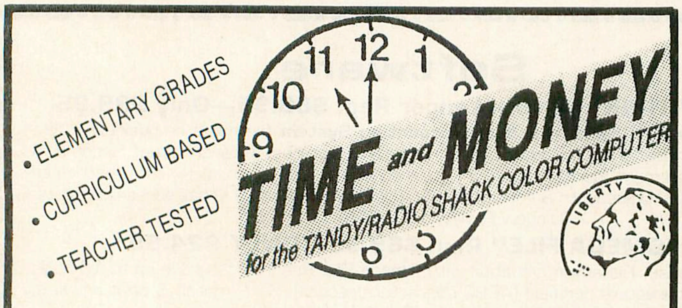
```
,0,0,0,0
310 DATA 0,0,0,0,6,6,3,3,3,5,5,0
,0,0,0,0
320 DATA 0,0,0,6,6,6,6,3,7,5,6,6
,0,0,0,0
330 DATA 0,0,0,6,6,6,3,7,7,5,6,6
,0,0,0,0
340 DATA 0,0,0,6,6,6,3,7,7,7,6,6
,0,0,0,0
350 DATA 0,0,6,6,6,7,7,7,7,7,6,6
,0,0,0,0
360 DATA 0,0,6,6,6,7,7,7,7,7,6,6
,0,0,0,0
370 DATA 0,0,6,6,6,7,7,7,7,7,7,6
,0,0,0,0
380 DATA 0,0,0,6,6,7,7,4,7,7,7,6
,0,0,0,0
390 DATA 0,0,0,6,7,7,7,4,4,7,6,6
,0,0,0,0
400 DATA 0,0,0,6,7,7,7,4,4,7,6,0
,0,0,0,0
410 DATA 0,0,0,6,6,7,7,4,4,7,6,0
,0,0,0,0
420 DATA 0,0,0,0,6,6,7,4,7,6,0,0
,0,0,0,0
430 REM SCAN FLAME IMAGE FROM DA
TA
440 FOR Y=0 TO 32 STEP 2:FOR X=0
 TO 30 STEP 2
450 READ V:IF V=0 THEN HRESET(X,
Y):GOTO 480
460 C=V+5 'COMPUTE CORRECT COLOR
470 HSET(X/2,Y/2,C)
480 NEXT X,Y
490 REM STORE FLAME IN HBUFFER #
1
500 HGET (0,0)-(16,16),1
510 HCLS0
520 REM DRAW AND GET DRADLES
530 DATA 0,0,0,0,0,0,0,0,0,0,1,1
,0,0,0
540 DATA 0,0,0,0,0,0,0,0,0,0,1,1
,0,0,0
550 DATA 0,0,0,0,0,0,0,0,0,1,1,1
,0,0,0
560 DATA 0,0,0,0,0,0,0,0,1,1,0
,0,0,0
570 DATA 0,0,0,2,2,0,0,0,1,1,1,0
,0,0,0
580 DATA 0,0,0,2,2,2,2,0,1,1,0,0
,0,0,0
590 DATA 0,0,2,2,2,2,2,2,1,2,2,2
,0,0,0
600 DATA 0,0,2,2,2,2,2,2,2,2,2,2
,2,0,0
610 DATA 0,0,2,2,2,2,2,2,2,2,2,2
,2,0,0
620 DATA 0,0,2,2,2,2,2,2,2,2,2,2
,2,0,0
630 DATA 0,2,2,2,2,2,2,2,2,2,2,2
,2,0,0
640 DATA 0,2,2,2,2,2,2,2,2,2,2,2
,0,0,0
650 DATA 0,2,2,2,2,2,2,2,2,2,2,2
,0,0,0
660 DATA 2,2,2,2,2,2,2,2,2,2,2,2
,0,0,0
670 DATA 2,2,2,2,2,2,2,2,2,2,2,2
,0,0,0
680 DATA 2,2,2,2,2,2,2,2,2,2,2,0
,0,0,0
690 DATA 0,1,2,2,2,1,2,2,2,2,2,0
,0,0,0
700 DATA 0,0,1,1,1,1,1,2,2,2,0,0
,0,0,0
710 DATA 0,0,1,1,1,1,1,1,1,1,0,0
,0,0,0
720 DATA 0,0,0,1,1,1,1,1,1,0,0,0
,0,0,0
730 DATA 0,0,0,1,1,1,1,0,0,0,0,0
,0,0,0
740 DATA 0,0,0,0,1,0,0,0,0,0,0,0
,0,0,0
750 REM SCAN DATA FOR DRADLE TO
SCREEN
760 FOR Y=0 TO 21:FOR X=3 TO 17
770 READ V
```



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```
780 IF V=0 THEN GOTO 800 ELSE IF
 V=1 THEN C=4 ELSE IF V=2 THEN C
=5
790 HSET(X,Y,C):HSET(X+40,Y,C):H
SET(X+80,Y,C):HSET(X+120,Y,C)
800 NEXT X,Y
810 REM SET UP "CORNERS" WITH HL
INES
820 HCOLOR 4
830 REM FRAME 0 CORNER LINES
840 HLINE(6,5)-(4,15),PSET
850 HLINE(7,5)-(4,15),PSET
860 HLINE(15,7)-(11,17),PSET
870 HLINE(15,8)-(12,17),PSET
880 REM FRAME 1 CORNER LINES
890 HLINE(8+40,5)-(5+40,15),PSET
900 HLINE(8+40,6)-(5+40,16),PSET
910 HLINE(9+40,6)-(6+40,16),PSET
920 HLINE(10+40,6)-(7+40,16),PSE
T
930 REM FRAME 2 CORNER LINES
940 HLINE(10+80,7)-(8+80,16),PSE
T
950 HLINE(11+80,7)-(9+80,16),PSE
T
960 HLINE(12+80,6)-(9+80,16),PSE
T
970 REM FRAME 3 CORNER LINES
980 HLINE(13+120,6)-(10+120,16),
PSET
990 HLINE(14+120,6)-(10+120,17),
PSET
1000 HLINE(14+120,7)-(11+120,17)
,PSET
1010 REM *"GET" DRADLE FRAMES IN
TO
1020 REM  APPROPRIATE HBUFFER AR
EAS
1030 HBUFF 2,242
1040 HGET (0,0)-(20,21),2    'FR
AME 0
1050 HBUFF 3,242
1060 HGET (40,0)-(60,21),3   'FR
AME 1
1070 HBUFF 4,242
1080 HGET (80,0)-(100,21),4  'FR
AME 2
1090 HBUFF 5,242
1100 HGET (120,0)-(140,21),5 'FR
AME 3
1120 HCLS
1130 REM DRAW MENORAH
1140 HDRAW "C1;BM55,36;M62,36;M6
2,48;M69,48;M69,96;M76,96;M76,10
2;M90,102;M90,108;M132,108;M132,
96;M90,96;M90,90;M83,90;M83,36;M
```

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```
90,36;M90,78;M97,78;M97,84;M132,
84;M132,78;M111,78;M111,72;M104,
72;M104,36;M111,36;M111,60;M118,
60;M118,66"
1150 HDRAW "M132,66;M132,54;M125
,54;M125,36;M132,36;M132,48;M139
,48;M139,54;M146,54;M146,30;M160
,30;M160,54;M167,54;M167,48;M174
,48;M174,36;M181,36;M181,54;M174
,54;M174,66;M188,66;M188,60;M195
,60;M195,36;M202,36;M202,72;M195
,72;M195,78"
1160 HDRAW "M174,78;M174,84;M209
,84;M209,78;M216,78;M216,36;M223
,36;M223,90;M216,90;M216,96;M174
,96;M174,108;M216,108;M216,102;M
230,102;M230,96;M237,96;M237,48;
M244,48;M244,36;M251,36;M251,60;
M244,60;M244,108;M237,108;M237,1
14;M223,114"
1170 HDRAW "M223,120;M174,120;M1
74,138;M167,138;M167,144;M160,14
4;M160,156;M167,156;M167,168;M17
4,168;M174,174;M188,174;M188,180
;M209,180;M209,186;M216,186;M216
,192;M90,192;M90,186;M97,186;M97
,180;M118,180;M118,174;M132,174;
M132,168;M139,168"
1180 HDRAW "M139,156;M146,156;M1
46,144;M139,144;M139,138;M132,13
8;M132,120;M83,120;M83,114;M69,1
14;M69,108;M62,108;M62,60;M55,60
;M55,36"
1190 HPAINT (153,31),1,1
1195 REM "HAPPY HANUKKAH" MESSAG
E
1200 HCOLOR 7,0:HPRINT(13,0),"HA
PPY HANUKKAH"
1210 REM DRAW STAR OF DAVID
1220 HDRAW "C6;BM62,132;F42;L84;
E42;BM62,186;E42;L84;F42"
1230 REM CENTER
1240 HPAINT(62,162),3,6
1250 REM CORNERS
1260 HPAINT(62,138),2,6
1270 HPAINT(85,150),2,6
1280 HPAINT(85,168),2,6
1290 HPAINT(35,168),2,6
1300 HPAINT(35,147),2,6
1310 HPAINT(62,180),2,6
1320 REM PLACE SHAMAS AND 1ST FL
AME
1330 HPUT(147,14)-(163,30),1,PSE
T
1340 HPUT(240,20)-(256,36),1,PSE
T
1350 REM MAIN LOOP OF PROGRAM
1370 X1=287:X2=307:DX=-2:DM=6:DB
=1
1380 IF F=0 THEN F=1:PALETTE 10,
B(MO):PALETTE 8,S(MO) ELSE IF F=
1 THEN F=0:PALETTE 10,S(MO):PALE
TTE 8,B(MO) 'FLICKER THE FLAMES
1390 PALETTE 7,RND(63) 'FLASH TE
XT
1400 IF INKEY$<>"" THEN GOSUB 15
60 'ADD DAY IF KEY PRESSED
1410 CC=CC+1 'UPDATE CYCLE COUNT
 FOR DRADLE
1420 DB=DB+1:IF DB=6 THEN DB=2 '
CALCULATE NEXT DRADLE FRAME BUFF
ER #
1430 X2=X2+DX:X1=X1+DX 'UPDATE D
RADLE POSITION
1440 REM CHECK FOR DRADLE OUT-OF
-BOUNDS
1450 IF X2>307 THEN X2=307:X1=28
7
1460 IF X1<219 THEN X1=219:X2=23
9
1470 REM DRAW DRADLE IN NEW POSI
TION, OLD IMAGE OVERWRITTEN
1480 HPUT (X1,170)-(X2,191),DB,P
SET
1490 IF CC<=DM THEN 1380 'IF STI
LL MOVING DRADLE, JUMP BACK TO B
EGINNING NOW
1500 DX=3-RND(RND(3)):IF RND(2)=
1 THEN DX=-DX 'NEW DRADLE SPEED
1510 IF DX=0 THEN IF RND(3)<>2 G
OTO 1500 'KILL ZEROS, ADD DELAY
1520 DM=RND(8)+2 'HOW FOR TO GO
AT THAT SPEED
1530 CC=0 'CLEAR CYCLE COUNT
1540 GOTO 1380
1550 REM ADD A FLAME
1560 HD=HD+1
1570 ON HD GOSUB 1600,1610,1620,
1630,1640,1650,1660
1580 RETURN
1590 REM HPUT STATEMENTS FOR EAC
H FLAME
1600 HPUT(212,20)-(228,36),1,PSE
T:RETURN 'DAY 2
1610 HPUT(193,20)-(209,36),1,PSE
T:RETURN 'DAY 3
1620 HPUT(170,20)-(186,36),1,PSE
T:RETURN 'DAY 4
1630 HPUT(122,20)-(138,36),1,PSE
T:RETURN 'DAY 5
1640 HPUT(101,20)-(117,36),1,PSE
T:RETURN 'DAY 6
1650 HPUT(80,20)-(96,36),1,PSET:
RETURN 'DAY 7
1660 HPUT(52,20)-(68,36),1,PSET:
RETURN 'DAY 8
```

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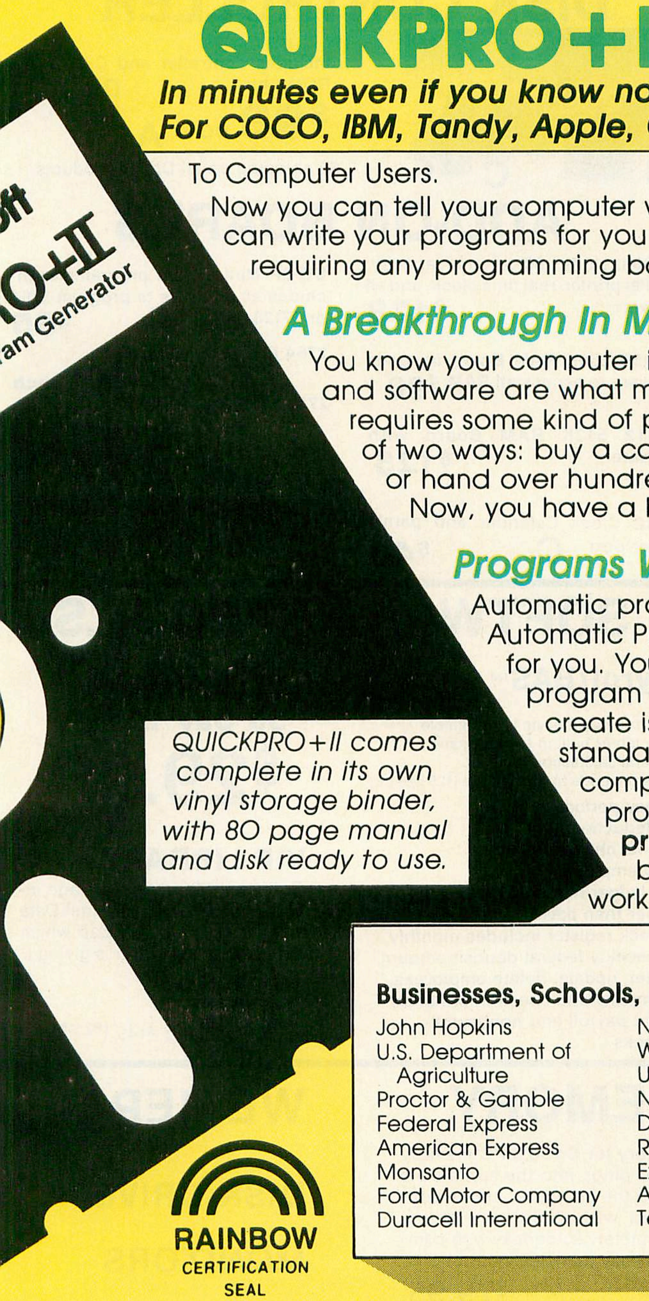

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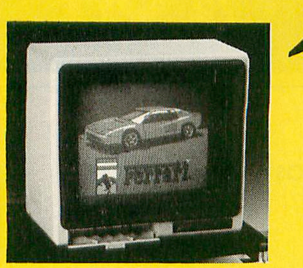

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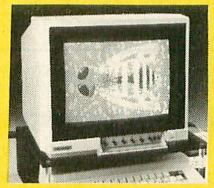

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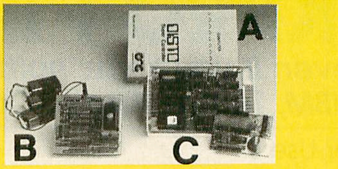

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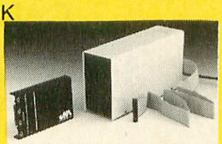

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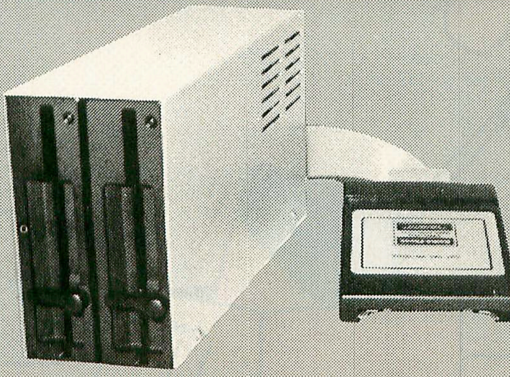

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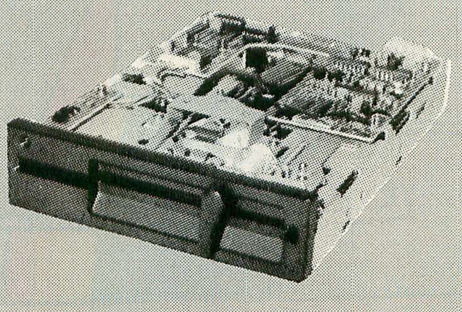

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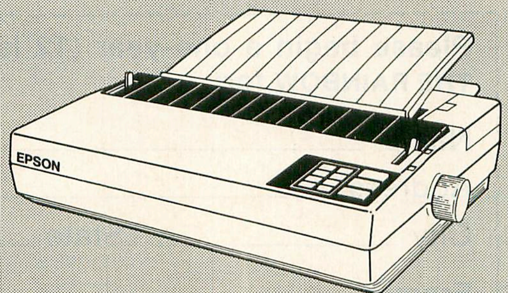

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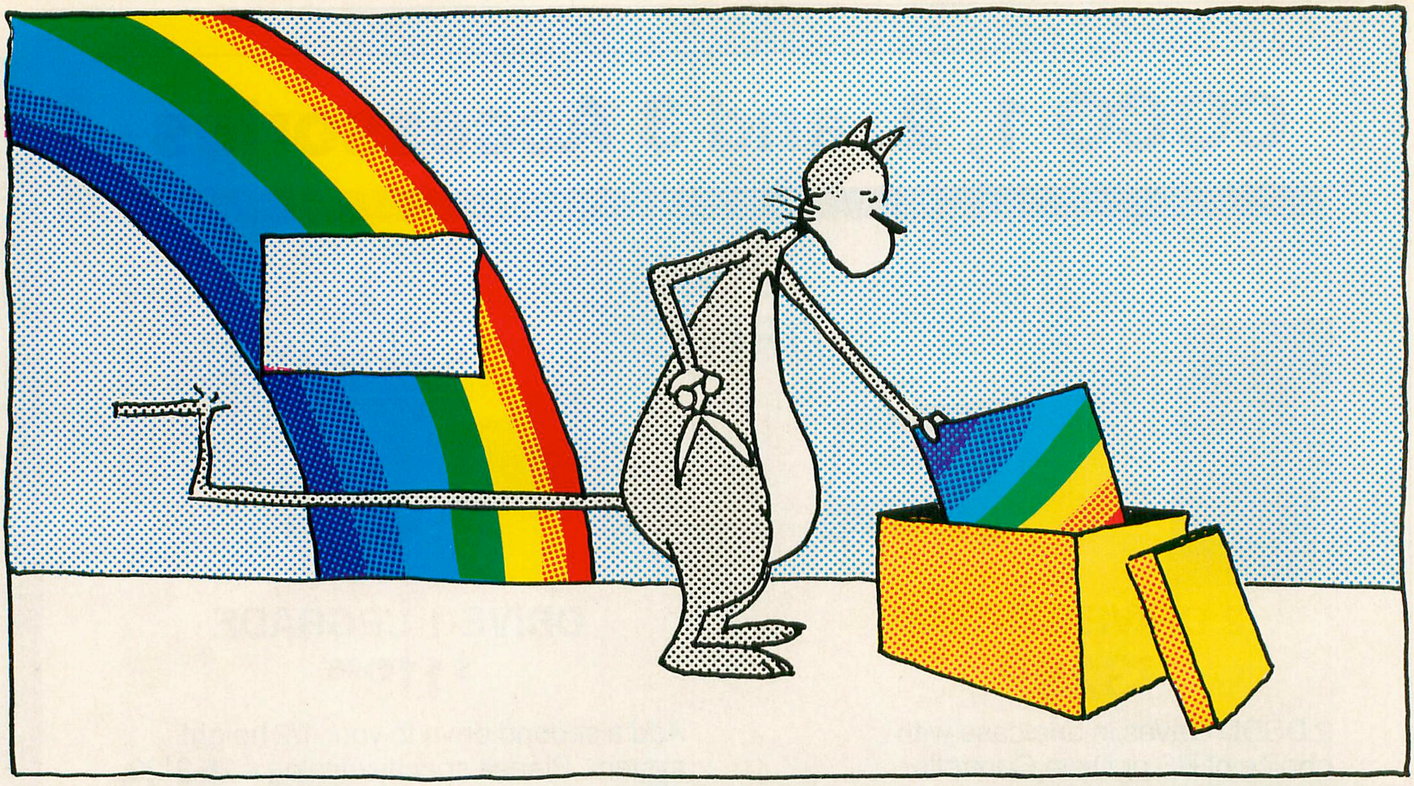

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RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

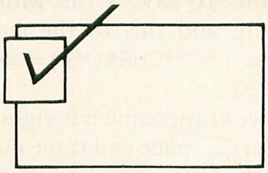
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: `CMDS` and `SOURCE`. It also contains a file, `read.me.first`, which explains the division of the two directories. The `CMDS` directory contains executable programs and the `SOURCE` directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the `SOURCE` directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the `CMDS` directory, enter `dir cmds`. Follow a similar method to see what source files are in the `SOURCE` directory.
5) When you find a program you want to use, copy it to the `CMDS` directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/` *filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal

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We will appreciate knowing of instances of violation of Seal use.

Keep those files secure

Secret Filenames

By Bill Bernico

Every now and then I run across a file on a disk with a strange "name" — if you could call it a "name." It looks more like a string of graphics characters from the Lo-Res `CHR$` set.

Not knowing what it was called, I didn't know how to load, run, or even kill it. I know a little more about them now, and I'd like to share what I've found so you can save your own disk files with these strange "names." That way, other folks won't be tampering with files you don't want them looking into. Or you and your friends can keep your files extra secure on your BBS.

There are two methods of saving: with or without a graphics extension. If you opt not to include the colorful extension, `BAS` will be used. Write down the correct combination of `CHR$` codes that went into making up your filename or you may not get that file off the disk later.

Creating the File

Let's create a file with one of these filenames. Type in Listing 1. To save it with the character string name, type in the following directly (no line number):

```
SAVE CHR$(128)+CHR$(145)+CHR$
(162)+CHR$(179)+CHR$(196)+
CHR$(213)+CHR$(230)+CHR$(247)
+"/"+CHR$(159)+CHR$(175)+CHR$
(191)
```

Next, type `DIR` and look at what you've saved. Looks a little strange, doesn't it? Even the extension has graphics characters. Later on, if you want to access that file, you'll have to know how to load it. Did you write down the combination of character strings that made up that name? It's easy to lose a file if you're not careful.

Loading the File

Now that the file is on disk, let's retrieve it. Type in Listing 2 and save it to disk. Notice that Line 20 contains the combination of character strings that you used to save Listing 1. To see how this all falls together, run this program and it will automatically load and run the first file, the one with the colorful name. Pretty slick, eh?

The third and fourth listings have the same results as the first two except these were done without graphics extensions, in which case `BAS` was assumed.

Character String File Syntax

Certain rules have to be followed in order to save, load and kill files with these types of "names." The most important rule is to know what you called that particular file. Without knowing what combination of character strings made up that filename, the rest of these rules won't help you at all.

First, to save a file with a `CHR$` name, type in or load the file you want to save (the old file with the regular name). Next, in the immediate mode, type in the following:

```
SAVE CHR$(X1)+CHR$(X2)+CHR$
(X3)+CHR$(X4)+CHR$(X5)+CHR$
(X6)+CHR$(X7)+CHR$(X8)
```

This will save the file with a `BAS` extension. To save a file with a `CHR$` extension, add this to the end of the `SAVE` line: `+"/"+CHR$(Y1)+CHR$(Y2)+CHR$(Y3)`.

Now your filename has eight colorful characters, a space and three more color blocks. To load this file, simply substitute the word `LOAD` for the word `SAVE` in the example above.

Killing a file like this is a little different. If it has a regular `BAS` extension, you have to substitute the word `KILL` for the word `LOAD` in the example above and add `+"/BAS"` to the end of the line. If it has a "color block" extension, add `+"/"+CHR$(Y1)+CHR$(Y2)+CHR$(Y3)` to the end of the line.

In each of these examples, `X1` through `X8` represents the number of the char-

---

Bill Bernico is a self-taught computerist who enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wisconsin.

acter string color block you want to use. The examples Y1 through Y3 represent the color blocks used in the extension. They can be the same as the ones used in the name. I just used these examples for clarity.

I think the benefit of this system is that someone else can't easily break into and modify my file. They can if they read this article, but they didn't count on one thing — the fact that you can also use character strings that can't be seen: `CHR$(13)`, `CHR$(32)` and `CHR$(143)`, for example. These are ENTER, space bar and a green block, which is invisible on a green background. Someone could try different combinations until the cows come home and still not hit upon your combination. The possibilities are endless.

(Questions about this program may be directed to the author at 708 Michigan Ave., Sheboygan, WI 53081. Please enclose an SASE for a reply.)☐

Listing 1:

```
10 CLS
20 PRINT"THIS IS A TEST FOR THE
DISK     CHARACTER STRING FILE S
AVING    ROUTINE.
30 PRINT:PRINT"TEST 1 COMPLETED.
 SEE. IT WORKS!
```

Listing 2:

```
10 CLS
20 LOAD CHR$(128)+CHR$(145)+CHR$
(162)+CHR$(179)+CHR$(196)+CHR$(2
13)+CHR$(230)+CHR$(247)+"/"+CHR$
(159)+CHR$(175)+CHR$(191),R
```

Listing 3:

```
10 CLS
20 PRINT"THIS IS A TEST FOR THE
DISK     FILE CHARACTER STRING S
AVE      ROUTINE WITHOUT THE GRA
PHIC     EXTENTION.
30 PRINT:PRINT"THIS PROCEDURE DI
FFERS SLIGHTLY FROM TEST 1 IN TH
E WAY FILES     ARE LOADED, SAVED
 AND KILLED.
40 PRINT:PRINT"TEST 2 COMPLETED.
 SEE. IT WORKS!
```

Listing 4:

```
10 CLS
20 LOAD CHR$(203)+CHR$(195)+CHR$
(198)+CHR$(204)+CHR$(201)+CHR$(1
99)+CHR$(200)+CHR$(193),R
```

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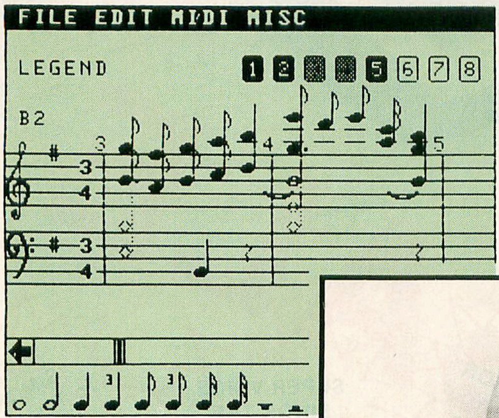

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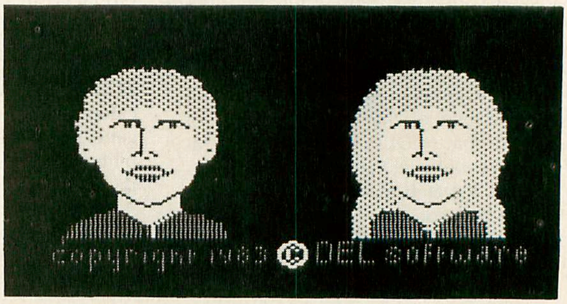

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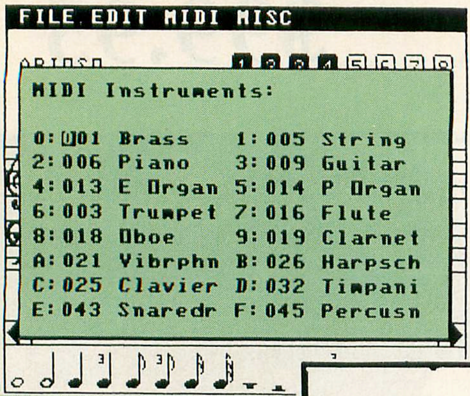

```
MIDI Instruments:

0:001 Brass      1:005 String
2:006 Piano      3:009 Guitar
4:013 E Organ    5:014 P Organ
6:003 Trumpet    7:016 Flute
8:018 Oboe       9:019 Clarnet
A:021 Vibrphn    B:026 Harpsch
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E:043 Snaredr    F:045 Percusn
```

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COCO MIDI 2

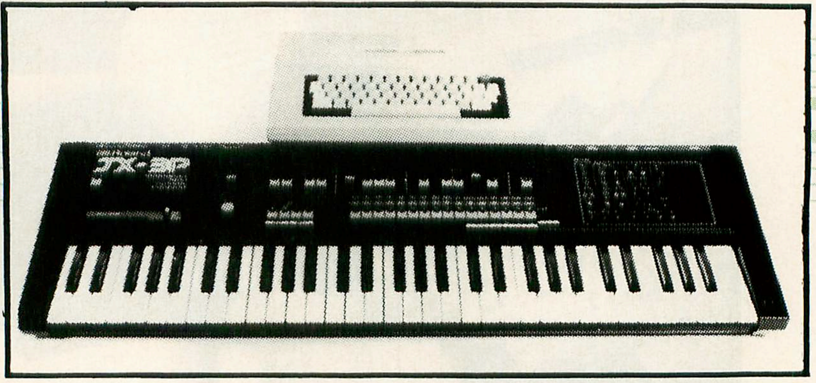
Coco 1, 2, 3 Compatible

Lyra COMPATIBLE!

Confused about MIDI?

"Understanding MIDI"

80 pages *$3.95*



NOW Print
Single Voice/
Track files
using
LYRA PRINT
$29.95

XMAS SALE

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, Yamaha, or Moog, it doesn't matter as long as it's MIDI equipped. Choose from our entry level MUSICA MIDI system that plays MUSICA files or our Professional COCO MIDI 2 system.

- Supports 16 Track recording and playback.
- Adjustable tempo.
- Over 45 Kbytes available (Over 15,500 MIDI events possible).
- Record to any track.
- Low Level track editing.
- LYRA editing. (one voice per track).
- Playback from any number of tracks.
- Quantizing to 1/16, 1/32, 1/64 intervals.
- Dynamic memory allocation.
- Filter out MIDI data:
  - Key pressure
  - Program change
  - Pitch wheel
  - Control Change
  - Channel Pressure
  - System Message
- Graphic Piano Keyboard Display in both record and playback mode.
- Adjustable Key (Transposition) for each track.
- Save recording to disk for later playback or editing.
- Syncs to drum machine as MASTER or SLAVE.
- PUNCH IN and PUNCH OUT editing.
- Sequencer features.
- 100% machine code.
- "Musician Friendly" Menu Driven.
- Metronome
- Many songs included.

Includes MIDI hardware interface, 2 MIDI cables, detailed manual, and software. Requires 64K CoCo, Y-Cable or Multi-Pak.

COCO MIDI 2 (disk only) #CM147 . **$149.95**
DOUBLE Y-CABLE #DY181 . . . . . . **$28.95**
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Save and load voice parameters for the Yamaha DX series of synthesizers (DX-7, DX-100, DX-21 etc.). Save sounds individually or as a group letting you load the entire synthesizer in seconds. Comes with professionally developed voices for the DX-7 worth 10 times the price. Requires COCO MIDI hardware interface.

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MUSICA MIDI™

MUSICA MIDI takes any MUSICA 2 music file and plays it through your MIDI synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using MUSICA 2. Inlcudes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.

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If you own the Casio CZ-101 or similar MIDI synth, you know that the *mini keys and the* short 3 or 4 octave keyboard is limiting. *MIDI KEYBOARD* when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.

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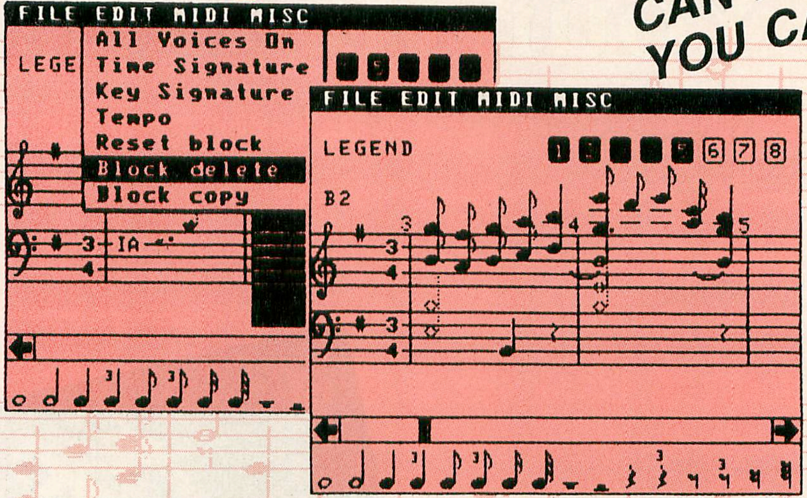

Coco 1, 2, 3 Compatible

A MUST FOR MIDI USERS

XMAS SALE

LYRA is the most powerful music composition program we have seen on any computer. We don't mean just the COCO, we really mean any computer. Whether you are a novice trying to learn music or a professional musician with MIDI equipment you will find LYRA a powerful tool. You see, we wrote LYRA for musicians that hate computers. If you want proof, purchase a LYRA demo for $7.95. We will apply the demo price to your purchase. MIDI output requires the LYRA MIDI cable (#MC158) or COCO MIDI Seq/Editor (#CM147).

- ✓ Ultra Easy to use, just point with joystick or mouse and click.
- ✓ Compose with up to 8 completely independent voices.
- ✓ Room for over 18,000 notes. (This is not a misprint!)
- ✓ Super Simple Editing Supports:
  - Note insert — Block insert
  - Note delete — Block delete
  - Note change — Block copy
- ✓ Output music to:
  - TV Speaker — Monitor Speaker
  - STEREO PAK — ORCHESTRA 90
  - SYMPHONY 12 — COCO MIDI S/E
  - MIDI Synth — MIDI Drum Machine
- ✓ Output up to 4 voices without additional hardware.
- ✓ Output all 8 voices using either SYMPHONY 12 or one or more MIDI synthesizers and drum machines.
- ✓ Output any voice on any of the 8 MIDI channels.
- ✓ Transpose music to any key.
- ✓ Modify music to any tempo.
- ✓ Automatically inserts bar for each measure as you compose.
- ✓ Key signature lets you specify sharps and flats only once, LYRA will do the rest.
- ✓ Plays MUSICA 2 files using LYRA CONVERT (#LC164).
- ✓ Each voice may be visually highlighted or erased.
- ✓ Each measure is numbered for easy reading.
- ✓ Solo capability
- ✓ Block edits are highlighted.
- ✓ Tie notes together for musical continuity.
- ✓ Name of note pointed to is constantly displayed.
- ✓ Jump to any point in the score instantaneously.
- ✓ Memory remaining clearly displayed, however you will have plenty of memory even for the most demanding piece.
- ✓ Help menu makes manual virtually unnecessary.
- ✓ LYRA is 100% software, no need for extra hardware unless you want more power.
- ✓ Music easily saved to tape or disk.
- ✓ Requires 64K and mouse or joystick.

LYRA (Disk only) #LY122 . . . . **$54.95**

LYRA OPTIONS

These LYRA options are **not** required. They are provided for those wishing additional flexibility.

LYRA CONVERT

A program to convert MUSICA 2 files to LYRA files.
(Disk) #LC164 . . . . **$14.95**

VERSION UPDATE

To receive the latest version of LYRA return your original disk. #UP162 . . . . **$10.00**

LYRA MIDI CABLE

A cable to connect your computer to your MIDI synthesizer.
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LYRA SYMPHONY 12 ENHANCER

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A collection of 50 songs ready to play for hours. Most have 7 and 8 voices. #LL137 . **$39.95**

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COCO MID Seq/Editor

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MUSIC LIBRARY

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Home Help 16K ECB

Keep Your Memories in Order

By Donald Turowski

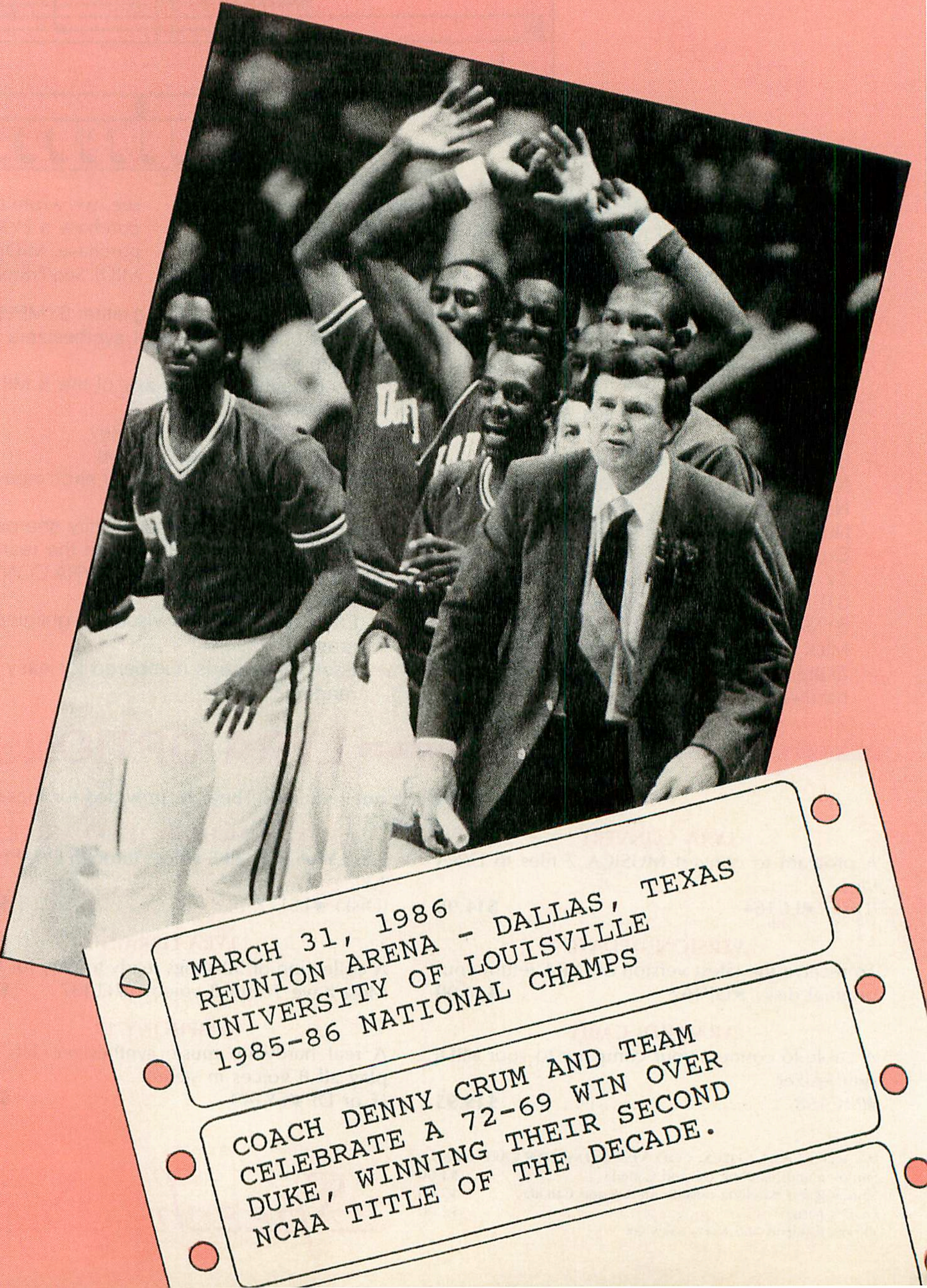
Have you ever looked through your photos months or years after they were taken and asked yourself, "Who's standing next to Uncle George?" or perhaps the most asked question about Halloween photos — "Who was that masked man?"

Well, *Photo Tagger* is here! It's a handy utility that prints photo information on mailing labels, which you stick on the back of your photos for future reference. No more wondering about when and where the picture was taken, who is in it and other easily forgotten information.

Photo Tagger works with any 16K or larger Color Computer with Extended Color BASIC. It is compatible with both cassette and disk systems and works with Radio Shack DOS, JDOS and ADOS. And, of course, it does require a printer to produce the labels. Radio Shack one-wide fanfold labels (Cat. No. 26-1328, or similar labels) are also required.

To use *Photo Tagger*, load the program, type `RUN` and press `ENTER`. On a 16K CoCo, you will need to enter `PCLEAR1` prior to loading the program.

Donald Turowski has a bachelor's degree in education and teaches algebra and computer literacy in the Burrells School District in Natrona Heights, Pennsylvania. He is married and has two children.



```
MARCH 31, 1986
REUNION ARENA - DALLAS, TEXAS
UNIVERSITY OF LOUISVILLE
1985-86 NATIONAL CHAMPS
```

```
COACH DENNY CRUM AND TEAM
CELEBRATE A 72-69 WIN OVER
DUKE, WINNING THEIR SECOND
NCAA TITLE OF THE DECADE.
```

A title screen appears and then you will be asked if you want instructions. Of course, you can bypass them.

Next, a message appears on the screen, prompting you to turn on the printer, and the program internally checks to see if it is on. If it is not, a message appears alerting you that the printer is not online. Once it is turned on, the message disappears and the program continues. The next message prompts you to line up the labels with the print head.

Now you are ready to begin the data entry routine. Place one of your snapshots in front of you and begin entering the information that is asked for by *Photo Tagger*. The first question is "Date of Picture?" This can be entered in any manner, such as 11/12/86 or November 12, 1986, or simply Summer 1986. (Since `LINE INPUT` statements are used in the program, commas may be used with no difficulty. If `INPUT` statements had been used, this would not be possible.)

The next question is "Location of Picture?" You have 29 characters to work with for each of these prompts. An entry such as "Disney World, Orlando" would be fine, but "Disney World, Orlando, Florida" would be too long, unless you eliminated the spaces. If your entry is too long, *Photo Tagger* alerts you, asking you to reenter the information in a shorter version.

The third question is "People, Places, Things in Picture?" Be creative in entering this information, keeping in mind the 29 character-length maximum. Also, if you feel you need more than one line for this type of information, you can continue it in Question 4.

Question 4 is "Further Information?" If you need to continue with information on people, places and things (from Question 3), then by all means do so. And, if you do not want to add any further information, simply press ENTER, which prints a blank line on the label.

After you enter all this information, you will be asked to approve of your entries by answering the prompt, "Is This Correct?" If the information is acceptable, press Y, and printing begins. But if you see a mistake, press N and you will be given an opportunity to reenter your information.

When prompted for the Date of Picture, you do not have to reenter the information if it is already correct; *Photo Tagger* has a built-in feature that allows you to type a slash mark (/) to keep the current data. This means that if your only mistake was on Location of Picture, and everything else is correct, then you could enter a / for Date of Picture, enter the corrected information for the Location, and then simply enter / for each of the remaining two questions. This makes *Photo Tagger* very easy to use and edit.

This feature is also very helpful when all of your pictures have the same date, location or subject. Simply enter / for each question and you can produce your labels quickly and easily.

Once you use *Photo Tagger*, you will see how helpful the CoCo can be in keeping track of information that is routinely forgotten. No more wondering and guessing "Is that really Aunt Mary next to Uncle Bill?" or "Was this taken on Johnny's 14th or 15th birthday?" Now then, let me see, was that masked man in the spandex tights and red cape really Cousin Frank or Uncle Bob or . . .

(Questions about this program may be directed to the author at 1236 Ninth Avenue, Natrona Heights, PA 15065. Please enclose an SASE for a reply.) ☐

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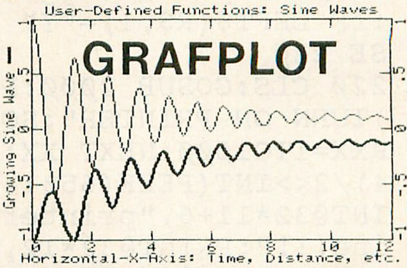

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220 ......28 1160 233
271 ....50 END 202
350 146

The listing: PHOTOTAG

```
10 '*************
20 '* PHOTO TAG  *
30 '*  UTILITY   *
40 '*    BY      *
50 '*D.A.TUROWSKI*
60 '* AUGUST '86 *
70 '*************
75 CLEAR5000
80 CLS(0):FOR X=3 TO 61:SET(X,5,
8):SET(X,25,8):NEXT X:FOR Y=5 TO
 25:SET(3,Y,8):SET(61,Y,8):NEXT
Y
90 FOR Y=2 TO 4:SET(54,Y,4):SET(
58,Y,4):NEXT Y:FOR X=54 TO 58:SE
T(X,2,4):NEXT X
100 FOR X=10 TO 50:SET(X,7,2):SE
T(X,20,2):NEXT X
110 FOR Y=7 TO 20:SET(10,Y,2):SE
T(50,Y,2):NEXT Y
120 FOR X=7 TO 9:SET(X,8,6):NEXT
 X
130 GOTO 1000
200 REM
210 CLS(RND(8)):GOSUB 2000:PRINT
@32*8,"DO YOU NEED INSTRUCTIONS
ABOUT  <photo-tagger>";:INPUT R$
:IF LEFT$(R$,1)="Y" THEN 3000 EL
SE 220
220 CLS:GOSUB 2000:PRINT@32*3,"1
)TURN ON PRINTER":SOUND 200,3:FO
RXX=1TO1000:NEXT XX:IF PEEK(6531
4)/2<>INT(PEEK(65314)/2) THEN PR
INT@32*11+6,"printer is not on l
ine!!!":PRINT@32*12,"turn printe
r on at this time!!!":FORXX=1TO1
000:NEXT XX:GOTO220
230 CLS:GOSUB 2000:PRINT@32*5,"2
)LINE UP LABELS IN PRINTER WITH
 PRINT HEAD AT THIS TIME":SOUND
230,2
240 PRINT@32*10,"    PRESS ANY KE
Y TO CONTINUE":EXEC44539
250 PLAY"O3;V31;L10;A;V16;A;V8;A
;V3;A;V1;L20;A"
255 CLS(RND(8)):GOSUB 2000
257 PRINT@32*14,"[press / to kee
p last entry!!!!]";
260 PRINT@32*7,"date of picture"
;: LINE INPUT A$:IF LEN(A$)>29 T
HEN PRINT "LINE TOO LONG, PLEASE
 RE-ENTER":GOTO 260
261 IF A$="/" THEN A$=E$:GOTO 27
0
262 E$=A$
270 PRINT"location of picture":L
INE INPUT B$:IF LEN(B$)>29 THEN
PRINT "LINE TOO LONG, PLEASE RE-
ENTER":GOTO 270
271 IF B$="/" THEN B$=F$:GOTO 28
0
272 F$=B$
280 PRINT"people,places,things i
n picture":LINE INPUT C$: IF LEN
(C$)>29 THEN PRINT"LINE TOO LONG
, PLEASE RE-ENTER":GOTO 280
281 IF C$="/" THEN C$=G$:GOTO 29
0
282 G$=C$
290 PRINT"further information":L
INE INPUT D$: IF LEN(D$)>29 THEN
 PRINT"LINE TOO LONG, PLEASE RE-
ENTER":GOTO 290
291 IF D$="/" THEN D$=H$:GOTO 30
0
292 H$=D$
300 CLS(RND(8)):GOSUB 2000:PRINT
@32*4,"is this correct?":PRINTST
RING$(32,"-");:PRINT@32*6,A$:PRI
NTB$:PRINTC$:PRINTD$:PRINT STRIN
G$(32,"-");:SCREEN 0,1
310 R$=INKEY$:IF R$="" THEN 310
315 IF R$="Y" OR R$="y" THEN 320

316 IF R$="N" OR R$="n" THEN 255
317 GOTO 310
320 REM ROUTINE TO PRINT ON THE
    LABELS
325 PRINT@32*14+8,"stand by-prin
ting!!";
330 PRINT#-2,A$
340 PRINT#-2,B$
350 PRINT#-2,C$
360 PRINT#-2,D$
370 PRINT#-2:PRINT#-2
380 PRINT@32*14,"press <C> TO CO
NTINUE,<E> TO END";:LINE INPUT R
$:IF R$="C" THEN 255 ELSE IF R$=
"E" THEN END ELSE 380
1000 REM ROUTINE FOR TITLE SCREE
N
1010 A$=CHR$(34)+"photo"+CHR$(12
8)+"tagger"+CHR$(34):L=5:GOSUB10
60

1020 A$="by":GOSUB1070
1030 A$="d.a.turowski":GOSUB1070
1040 A$="august--1986":GOSUB1070
```

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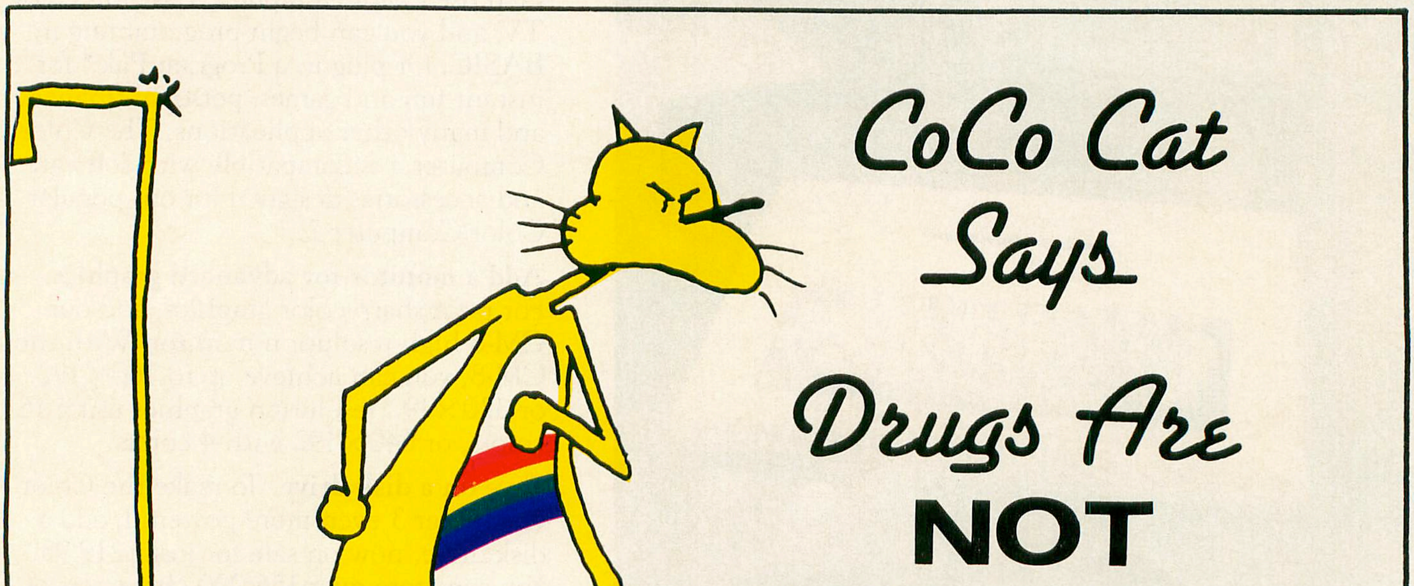
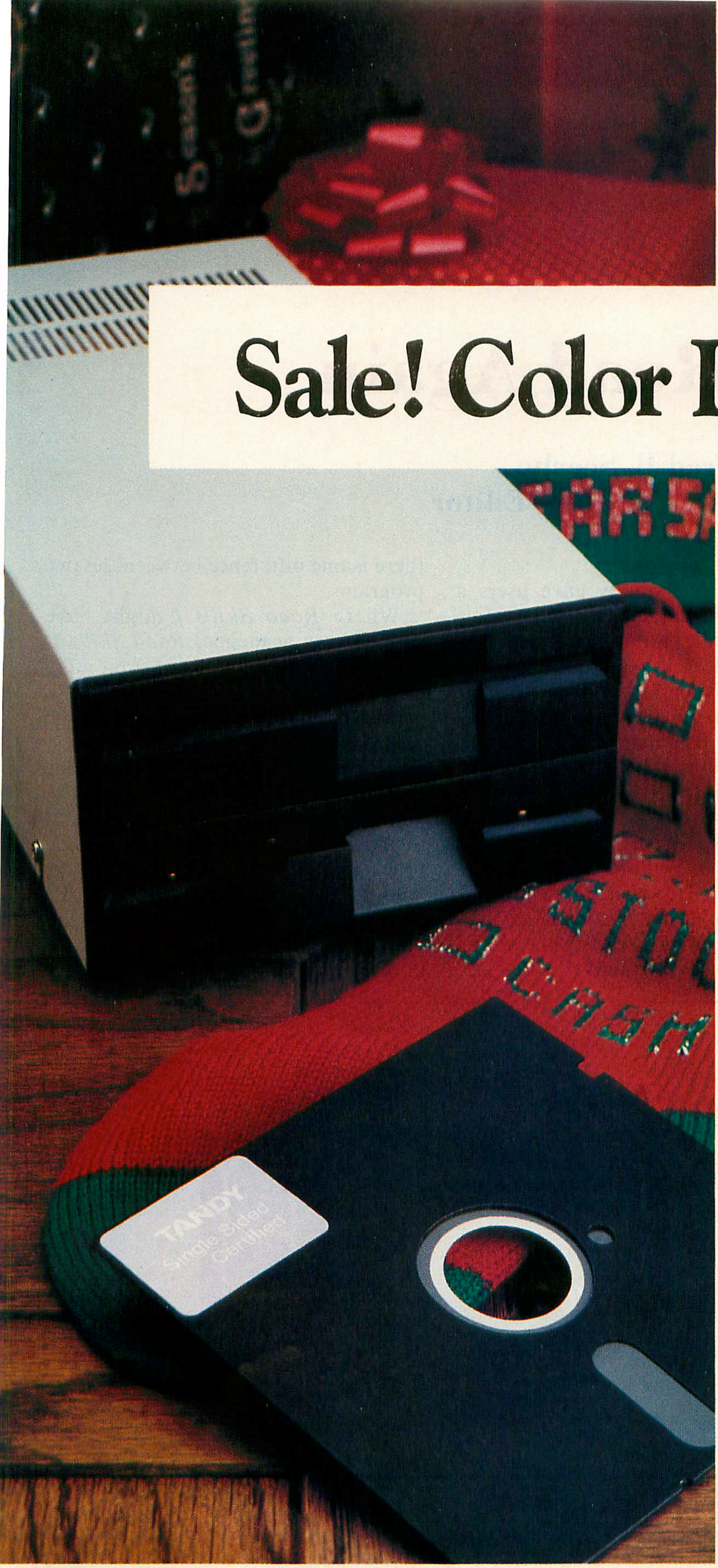
Sale ends 12/24/87. Reg. $199.95. FD-502 Color Disk #0 reg. $299.95. Prices apply at Radio Shack Computer Centers and participating stores and dealers. Television, Program Pak and disk drive sold separately.

```
1050 GOTO 1180
1060 REM CLS(0)
1070 M=LEN(A$)
1080 FOR X=1TOM
1090 PRINT@32*L+15-M/2+X,MID$(A$
,X,1);
1100 SOUND100,1
1110 NEXT X
1120 L=L+1
1130 SOUND 200,1
1140 FOR S=1TO80:NEXTS
1150 RETURN
1160 'ROUTINE BY JOHN D. BOYLE
     FROM RAINBOW MAGAZINE 2/85
1170 'PROGRAM LISTING 2
1180 SCREEN 0,1:FOR XX=1 TO 500:
:NEXT XX:FOR YY=1TO3:PLAY"O3;V31
;L10;A;V16;A;V8;A;V3;A;V1;L20;A"
:NEXT YY
1190 GOTO 200
2000 PRINT@10,"photo"+CHR$(128)+
"tagger";:PRINT@32*2+8,"by"+CHR$
(128)+"d.a.turowski";:RETURN
3000 CLS:PRINT:PRINT"photo-tagge
r  IS A UTILITY TO    HELP YOU KE
EP TRACK OF YOUR      PHOTOS. IT
WILL PRODUCE ON A     MAILING LAB
EL THE INFORMATION   THAT YOU US
UALLY FORGET TO WRITEON THE BACK
 OF THE PHOTO SUCH ASTHE DATE, P
EOPLE OR PLACES IN"
3010 PRINT"THE PHOTO, AND ALSO A
NY OTHER   GENERAL INFORMATION Y
OU MAY WANTTO REMEMBER!"
3015 PRINT@32*15+5,"HIT ANY KEY
TO CONTINUE";:EXEC44539
3020 CLS:PRINT:PRINT"photo-tagge
r IS SELF-PROMPTING  AND BY USIN
G IT AFTER YOU        GET A NEW B
ATCH OF PICTURES, YOUAND YOUR CO
MPUTER CAN QUICKLY   PRODUCE LAB
ELS TO PLACE ON THE  BACK OF EAC
H PICTURE."
3025 PRINT"ALSO, IF YOU ARE TYPI
NG THE SAMEINFORMATION REPEATEDL
Y FOR A SETOF PICTURES, FOR EXAM
PLE, THE    SAME DATE, BY PRESSIN
G THE '/'  KEY, photo-tagger WIL
L DEFAULT  TO THE LAST USED ENTR
Y. ENJOY!!"
3030 PRINT@32*15,"press <enter>
to begin photo-tag";:EXEC 44539:
GOTO 220
```





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Taking it to the streets

On the Road Again

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

Several months ago I presented *Road Skills I*, the first drivers' education software for the Color Computer. The program worked in 16K Color BASIC and provided a quick overview of driving rules common in all 50 states. I have used the program with my students and find it to be quite useful in preparing them for their learner's permit test.

The ink had barely dried on the issue containing *Road Skills* (September 1987, Page 90) when RAINBOW managing editor Jutta Kapfhammer suggested I follow up with a possibility I hinted at in the article — that I could come up with a "Part II" involving the various road, highway and traffic signs. Since readers are always asking me to write more graphic programs that would work on the CoCo 1 and 2, as well as 3, *Road Skills II* seemed like a logical progression. Also, many people have written asking for more software for the Speech/Sound Pak.

Therefore, readers, here you are: the first fully graphic drivers' education program for the Color Computer.

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

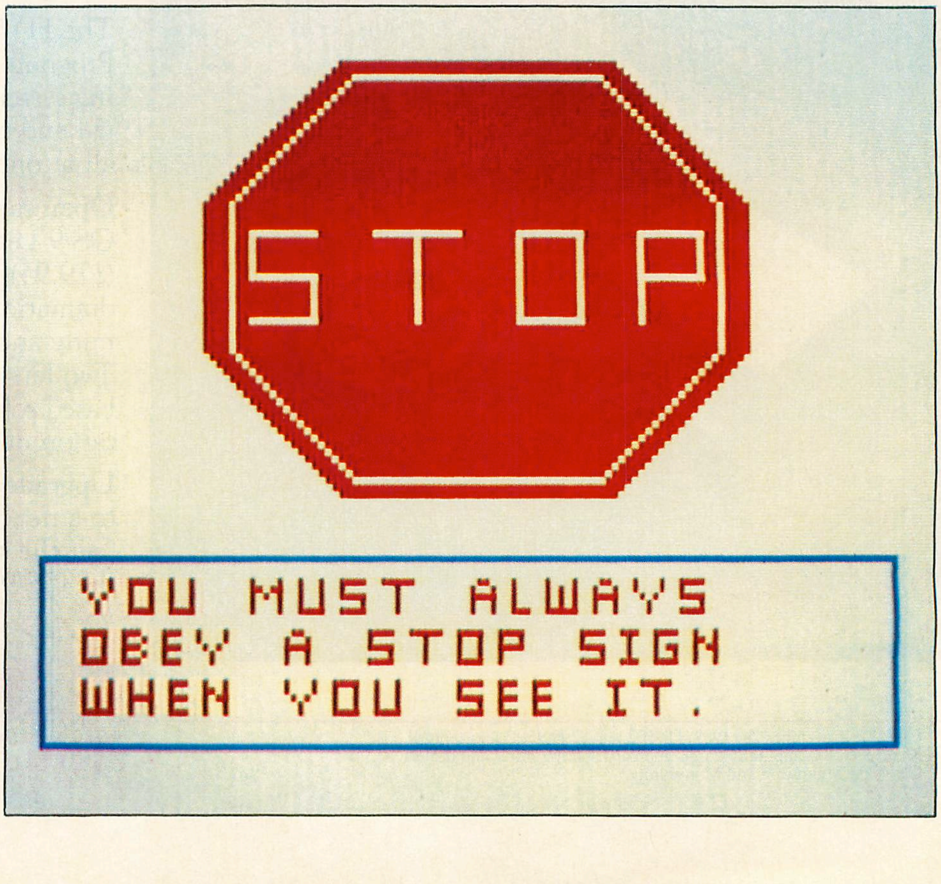
The Goal

Road Skills I simply gave users a chance to review standard driving information on an inverse video screen. The program allowed you to review the material as much as you wanted, later allowing you to quiz yourself on the information. Its only graphics were Lo-Res illustrations showing the right-of-way laws at intersections.

In order to create the graphics required to display various traffic signs, I wrote *Road Skills II* in Color Extended BASIC. However, to save memory, I did use `PMODE2/1` for both illustrations and graphic text displays. The results are very attractive. However, there is one difference between the two programs.

Where *Road Skills I* might have seemed very academic, *Road Skills II* could strike some of you as a bit more elementary. I mean, how much intelligence does it take to realize a stop sign means *stop*?

However, there is some value to this kind of program. It can be used with younger students who are years from their driving permits. It's never too early to learn the meaning of warning signs. Add to that the use of the Speech/Sound Pak (optional, of course) and you have a program that is suitable for both younger and older students.



```
YOU MUST ALWAYS
OBEY A STOP SIGN
WHEN YOU SEE IT.
```

Using the Program

As with all my programs, take great care to be very precise in typing it in, especially the `DATA` statements. One mistake in the data and the program will not run properly. Also, since the program contains poke commands, be sure to save it to tape or disk before trying to run it. A misplaced `POKE` could cause you to lose all of your typing by locking up your machine.

As with some of my other recent graphic educational programs, I have redrawn a graphic text character set to display our writing in a number of colorful ways. All of the text will be drawn out of view on graphic pages 3 and 4, later being copied (by `PCOPY`) to pages 1 and 2, which we are viewing. The same goes for all of our graphic signs. This way, they just pop into view, like a fancy machine language program.

On running the program, you will be asked if you want (T)alking or (N)ot. If you press T with the Speech Pak in place, the program will advance itself. Pressing N for no talking will allow the user to pace himself or herself by pressing ENTER to advance to each new screen. Thus, if you have a small child who cannot read, you can advance the screens along while you read the material to him or her.

Next, either a red or blue screen appears. Press ENTER if the screen is red. If the screen is blue, press the reset button and run until the screen is red. This sets the correct color pattern for our signs. (You wouldn't want a *blue* stop sign, now, would you?)

> ***"This way is better for this program."***

You may wonder why I'm not using my old technique of setting a variable from the color on the screen. Believe it or not, in some graphics, that is not suitable. It has more to do with pixel location than anything else. Take my word for it — this way is better for this program.

There is no quiz in this program. It would be too difficult to fit questions and the graphics on the screen all at once. Therefore, this program is strictly educational and not diagnostic, like *Road Skills I.*

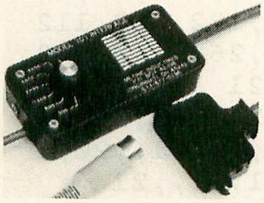
You will notice that I have not covered a lot of different signs, but have instead concentrated on categories with examples. On running the program, you will see what I mean. Of course, that leaves the door open for parts III and IV, if necessary. One such program could even deal with pedestrian signals for youngsters. Let me know if you would find such a program valuable. (I know some of my more limited special needs students would definitely benefit from such a program.)

At the conclusion of the last frame, the program will rerun itself for another person to sit and watch. When you use the program, you will find that it actually does take some time to listen to. Even done without speech, the program is lengthy and contains quite a bit of information. Only you can decide how valuable it can be for your family or students.

If you can suggest some additional areas that this drivers' education series can cover, drop me a line. I am always looking for new ideas.

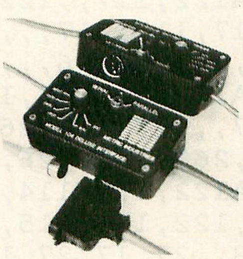
Until next month, thank you for all your kind letters of support. They mean a great deal to me when my typing fingers get sore. ☐

Model 101 Interface $39.95



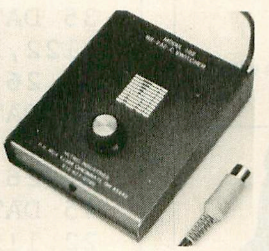
- Serial to parallel interface
- Works with any COCO
- Compatible with "Centronics" parallel input printers
- 6 switch selectable baud rates 300-600-1200-2400-4800-9600
- Small size 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

Model 104 Deluxe Interface $51.95



Same features as 101 plus
- Built in serial port for your modem or other serial device
- Switch between parallel output and serial output
- Size is 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

Model 102 Switcher $35.95



- Connect to your COCO serial port and have 3 switch selectable serial ports
- Color coded indicator lights show switch position
- Lights also serve as a *power on* indicator for your COCO
- Heavy guage blue anodized aluminum cabinet with non-slip rubber feet

Model 105 Switcher $14.95

- Connects to your COCO to give you 2 switch selectable serial ports
- 3 foot cable to connect to your COCO's serial port
- The perfect item to use to connect a printer and a modem to your COCO
- Small in size, only 4.5 x 2.5 x 1.25

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- New Version - tape transferrable to disk - save and load labels from tape to disk
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- 16K ECB required

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The 101 and 104 require power to operate. Most printers can supply power to your interface. (Star, Radio Shack and Okidata are just a few that do - Epson and Seikosha do not). The interfaces can also be powered by an AC adaptor; Radio Shack model 273-1431 plugs into all models. If you require a power supply, add a "P" to the model number and add $5.00 to the price. (Model 101P $44.95, Model 104P $56.95).

The Model 101, 102, 104 and 105 work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Itoh, Seikosha, Panasonic and many others. They support BASIC print commands, word processors and graphic commands.

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Requirements: a Coco I, II or III with at least 32K, one disk drive, BASIC 1.0/1.1, ADOS 1.0/1.1 or JDOS. Printers supported include: Epson RX/FX, Gemini 10X, SG10, NX10, C-Itoh 8510, DMP 100/105/110/130/430 CGP220, many Okidata (check with Zebra), Seikosha GP100/250, Gorilla Banana, Legend 808.
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50	75	435	128
140	153	470	192
250	84	515	194
290	57	570	251
325	4	END	84
365	64		

The listing: ROAD II

```
1 REM*****************************
2 REM*  DRIVING INSTRUCTOR 2     *
3 REM*   KNOWING ROAD SIGNS      *
4 REM*    BY FRED B.SCERBO       *
5 REM*     60 HARDING AVE        *
6 REM*  NORTH ADAMS,MA 01247     *
7 REM*   COPYRIGHT (C) 1987      *
8 REM*****************************
10 CLS0:CLEAR1000:FORI=1TO32:PRI
NTCHR$(188);:NEXT:FORI=1TO192:RE
ADA:IFA=0THENA=16
15 PRINTCHR$(A+112);:NEXT
20 DATA126,124,122,126,124,122,1
26,124,122,125,124,125,,,30,28,2
6,29,,,30,20,30,20,30,16,20,30,,
21,28,29
25 DATA122,,122,122,,122,122,96,
122,117,,117,,,26,,24,21,16,22,1
6,,26,,26,,16,26,,21,,20
30 DATA123,115,122,122,,122,123,
115,122,117,96,117,,,27,19,18,21
,22,16,,,26,,26,,16,26,,21,19,19
35 DATA122,117,,122,,122,122,112
,122,117,112,117,,,,,26,21,20,18
,,,26,,26,,16,26,,,,21
40 DATA122,117,96,122,,122,122,,
122,117,,117,,16,26,,26,21,,20,1
8,,26,,26,21,16,26,21,21,,21
45 DATA122,117,114,123,115,122,1
22,112,122,119,115,119,,,27,19,2
6,23,18,,27,17,27,17,27,23,17,27
,23,21,19,23
50 FORI=1TO32:PRINTCHR$(179);:NE
XT
55 PRINT@293," DRIVING INSTRUCTO
R 2 ";
60 PRINT@325,"  KNOWING ROAD SIG
NS  ";:PRINT@389,"    BY FRED B.S
CERBO    ";
65 PRINT@421,"  COPYRIGHT (C) 19
87  ";
70 PRINT@485," (T)ALKING OR (N)O
T ? ";
75 X$=INKEY$:IFX$="T"THEN95
80 IFX$="N"THEN90
85 GOTO75
90 NT=1
95 CLS0
```

```
100 XX=&HFF00:YY=&HFF7E
105 POKEXX+1,52:POKEXX+3,63
110 POKEXX+35,60
115 PMODE4,1:PCLS1
120 DIMR(23),L$(26),Y(40):C$(1)=
"C1":C$(2)="C2":C$(3)="C3":C$(4)
="C4"
125 FORI=1TO26:READL$(I):NEXT
130 GOTO260
135 AA$=JK$
140 A$=STR$(A):B$=STR$(B)
145 DRAW"S4BM"+A$+","+B$+C$(CL)
150 IF LEN(JK$)<=21THEN170
155 FOR T=21TO0STEP-1:IF MID$(JK
$,T,1)=" "THEN165
160 NEXT T:GOTO170
165 L$=LEFT$(JK$,T):W$=L$:GOSUB1
75:JK$=" "+RIGHT$(JK$,(LEN(JK$))
-T):GOTO140
170 W$=JK$:B=B+14:GOSUB175:RETUR
N
175 SL=LEN(W$):FORI=1TOSL:BB$=MI
D$(W$,I,1):C=ASC(BB$)-64:IF C=-3
2THEN DRAW"BR12":GOTO195
180 IF C=-18THENDRAW"BR2RBR9":GO
TO195
185 IFC=-20THENDRAW"BR2R2D2G2E4B
R7":GOTO195
190 DRAWL$(C)
195 NEXTI:B=B+14:RETURN
200 IFNT=1THEN240
205 FORII=1TOLEN(AA$)
210 IF PEEK(YY)AND 128=0 THEN210
215 POKEYY,ASC(MID$(AA$,II,1))
220 NEXTII
225 IFPEEK(YY)AND128=0THEN225
230 POKEYY,13
235 FORHH=1TO1600:NEXTHH:RETURN
240 FORHH=1TO3000
245 X$=INKEY$:IFX$=CHR$(13)THEN2
55
250 NEXTHH
255 RETURN
260 PMODE2,1:PCLS1:SCREEN1,1:PMO
DE1:SCREEN1,1:PCLS0:POKE65314,24
8
265 PCLS3:A=0:B=56:CL=4:JK$=" PR
ESS RESET AND RUN IF SCREEN IS B
LUE.":GOSUB135:B=B+20:JK$=" PRES
S ENTER WHEN THE SCREEN IS RED."
:GOSUB135
270 X$=INKEY$:IFX$<>CHR$(13)THEN
270
275 PCLS0:SCREEN0,0:R=3:BL=2:FOR
I=0TO256STEP4:PSET(I,1,3):PSET(I
+2,3,3):NEXT:DIMA(20):GET(0,0)-(
256,4),A,G:PCLS0
280 DATA U6E2R2F2D2NL4D4BR6,U8R4
```

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```
F2G2NL4F2G2NL4BR8,U8R4BD8NL4BR6,
U8R4F2D4G2NL4BR8,U8NR4D4NR4D4R4B
R6,U8NR4D4NR4D4BR10,U8R6BD4NL2D4
NL4BR6,U4NU4R6U4D8BR6
285 DATA R2U8L2R4L2D8R2BR6,NU4R4
U8L4R6BD8BR6,U8D4R2NE4F4BR6,NU8R
4BR6,U8F4E4D8BR6,U8F6NU6D2BR6,U8
R6D8NL6BR6,U8R6D4L6D4BR12,U8R6D8
NL6NH4NF2BR6
290 DATA U8R6D4L4F4BR6,R6U4L6U4R
6BD8BR6,BR4U8L4R8BD8BR6,NU8R6NU8
BR6,BU8D4F4E4U4BD8BR6,NU8R4NU6R4
NU8BR6,E8G4H4F8BR6,BU8D2F4ND2E4U
2BD8BR6,NR8E8NL8BD8BR6
295 PMODE2,1:PCLS1:SCREEN1,1:PMO
DE1:SCREEN1,1:PCLS0:POKE65314,24
8:PMODE2,3:PMODE1,3:COLOR2,3:GOT
O320
300 COLOR2,3:LINE(0,138)-(256,19
2),PSET,BF:B=152:A=0:CL=1:GOSUB1
35:PCOPY3TO1:PCOPY4TO2:GOSUB200:
RETURN
305 COLOR3,2:LINE(0,138)-(256,19
2),PSET,BF:B=152:A=0:CL=1:GOSUB1
35:PCOPY3TO1:PCOPY4TO2:GOSUB200:
RETURN
310 COLOR1,1:LINE(0,138)-(256,19
2),PSET,BF:B=152:A=0:CL=3:GOSUB1
35:PCOPY3TO1:PCOPY4TO2:GOSUB200:
RETURN
315 COLOR2,4:LINE(0,138)-(256,19
2),PRESET,BF:LINE(0,138)-(256,19
2),PSET,B:B=152:A=0:CL=3:GOSUB13
5:PCOPY3TO1:PCOPY4TO2:GOSUB200:R
ETURN
320 PCLS4:COLOR2,3:LINE(0,0)-(25
6,92),PSET,BF:B=16:A=0:CL=1:JK$=
" THIS PROGRAM WILL INTRODUCE YO
U TO SOME OF THE MOST COMMON ROA
D SIGNS USED IN THE UNITED STATE
S TODAY.":GOSUB135:PCOPY3TO1:PCO
PY4TO2:GOSUB200
325 COLOR3,2:LINE(0,98)-(256,192
),PSET,BF:A=0:CL=1:JK$=" WHILE N
OT ALL SIGNS USED HAVE BEEN INCL
UDED, THE SIGNS PRESENTED ARE A
GOOD CROSS SECTION OF THOSE IN U
SE.":GOSUB135:PCOPY3TO1:PCOPY4TO
2:GOSUB200
330 PCLS4:DRAW"S16C3BM128,120R10
E10U10H10L20G10D10F10R10":PAINT(
128,20),3,3:DRAW"C4BM128,116R9E9
U10H9L18G9D10F9R9"
335 JK$=" THIS IMPORTANT ROAD SI
GN HAS EIGHT SIDES AND IS RED.":
GOSUB300
340 JK$=" THIS ROAD SIGN IS THE
ONLY ONE WHICH IS THIS SHAPE.":G
OSUB305
345 JK$=" IT IS ALWAYS RED AND I
S PRINTED WITH LARGE WHITE LETTE
RS.":GOSUB310
350 DRAW"S12BM62,72C4"+L$(19)+L$
(20)+L$(15)+L$(16):JK$=" YOU MUS
T ALWAYS OBEY A STOP SIGN WHEN Y
OU SEE IT.":GOSUB315
355 JK$=" YOU MUST COME TO A COM
PLETE STOP WHEN YOU SEE IT.":GOS
UB300
360 JK$=" YOU MAY THEN PROCEED W
HEN IT IS SAFE TO DO SO.":GOSUB3
10
365 PCLS4
370 DRAW"S24BM128,132C1R2M+16,-2
0H2L30G2M+16,+20R2"
375 DRAW"S25BM134,126C3M+14,-18H
L26GM+14,+18"
380 DRAW"BM134,86M+7,-9HL12GM+7,
+9":PAINT(128,18),3,3
385 JK$=" THIS TRIANGULAR SHAPED
 SIGN IS USED FOR JUST ONE SIGN.
":GOSUB305
390 JK$="YIELD":B=42:A=108:CL=3:
GOSUB135:JK$=" YIELD MEANS THAT
YOU DO NOT HAVE THE RIGHT OF WAY
.":GOSUB300
395 JK$=" YIELD MEANS YOU MUST L
ET THE OTHER CAR GO BEFORE YOU."
:GOSUB315
400 JK$=" YOU MAY EVEN HAVE TO S
TOP BEFORE THE WAY TO GO IS CLEA
R.":GOSUB300
405 GOSUB410:GOTO430
410 PCLS4:DRAW"S8C1BM128,6R2M+38
,+30DM-38,+30L4M-38,-30UM+38,-30
R2"
415 PAINT(128,10),1,1
420 FORI=0TO128STEP4:PUT(0,I)-(2
56,I+3),A,OR:NEXT
425 DRAW"S8C1BM130,10M+36,+28M-3
6,+28M-36,-28M+36,-28":RETURN
430 JK$=" WARNING SIGNS ARE DIAM
OND SHAPED AND ARE YELLOW AND BL
ACK":GOSUB300
435 JK$=" SOME WARNING SIGNS HAV
E WORDS WHILE SOME OTHERS DO NOT
.":GOSUB305
440 JK$=" THEY ARE USED TO SHOW
THAT SOME KIND OF DANGER IS AHEA
D.":GOSUB315
445 DRAW"S12BM128,30C1R4D10R12D4
L12D10L6U10L12U4R12U10R2":PAINT(
128,34),1,1:JK$=" THIS SIGN IS S
EEN BEFORE COMING TO AN INTERSEC
TION.":GOSUB310
450 GOSUB410:DRAW"S8BM86,74C1"+L
```

```
$(19)+L$(12)+L$(15)+L$(23):JK$="
 THIS SIGN MEANS THAT YOU SHOULD
 SLOW DOWN.":GOSUB300
455 JK$=" IT MEANS THAT ROAD CON
DITIONS ARE NOT SAFE FOR HIGH SP
EEDS":GOSUB315
460 GOSUB410:DRAW"S8BM110,94C1U1
4EUEUERERER6M-4,-8M+18,+6G12U6L4
GLGLGDGD12L6":PAINT(114,90),1,1:
JK$=" THIS SIGN MEANS THAT THE R
OAD AHEAD CURVES TO THE RIGHT.":
GOSUB300
465 JK$=" YOU SHOULD REDUCE YOUR
 SPEED BEFORE REACHING THE CURVE
.":GOSUB305
470 GOSUB410:DRAW"S8BM146,94C1U1
4HUHUHLHLHL6M+4,-8M-18,+6F12U6R4
FRFRFDFD12R6":PAINT(142,90),1,1:
JK$=" THIS SIGN MEANS THAT THE R
OAD AHEAD CURVES TO THE LEFT.":G
OSUB300
475 JK$=" AGAIN YOU SHOULD REDUC
E YOUR SPEED BEFORE THE CURVE.":
GOSUB305
480 GOSUB410:DRAW"BM108,98C1NU32
RNU32RNU32BR4U4BU4U4RD4BD4D4BR4N
U12RU12NH4LH4BU4U4BU4U4LD4BD4D4B
U12BR6D12F12D8LU8H12U12LD12F12D8
BL4U4BU4U2LD2BD4D4"
485 JK$=" THIS SYMBOL MEANS THAT
 A RIGHT LANE DROP LIES AHEAD.":
GOSUB315
490 JK$=" TRAFFIC TO THE RIGHT M
UST MERGE WITH THE LEFT LANE.":G
OSUB300
495 GOSUB410:DRAW"BM152,98C1NU32
LNU32LNU32BL4U4BU4U4LD4BD4D4BL4N
U12LU12NE4RE4BU4U4BU4U4RD4BD4D4B
U12BL6D12G12D8RU8E12U12RD12G12D8
BR4U4BU4U2RD2BD4D4"
500 JK$=" THIS SYMBOL MEANS THAT
 A LEFT LANE DROP LIES AHEAD.":G
OSUB310
505 JK$=" TRAFFIC TO THE LEFT MU
ST MERGE WITH THE RIGHT LANE.":G
OSUB315
510 PCLS4
515 CIRCLE(128,58),68,1,.9:PAINT
(128,10),1,1
520 FORI=0TO128STEP4:PUT(0,I)-(2
56,I+3),A,OR:NEXT
525 CIRCLE(128,58),62,1,.9:CIRCL
E(130,58),62,1,.9
530 DRAW"S4BM128,52C1NE36NH36BD1
6NF36NG36BU8BR8NE36NF36BL16NH36N
G36":PAINT(128,58),1,1
535 DRAW"S12BM80,70U8R4D4L4F4RNH
4BR23U8R4D4L4F4RNH4"
540 JK$=" THIS SIGN MEANS A RAIL
ROAD CROSSING IS JUST AHEAD.":GO
SUB305
545 JK$=" YOU MUST STOP AND LOOK
 BOTH WAYS BEFORE CROSSING.":GOS
UB310
550 JK$=" YOU MUST NEVER CROSS T
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":GOSUB300
555 GOSUB560:GOTO565
560 PCLS4:DRAW"S8C1BM128,0R30F2D
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565 JK$=" REGULATORY SIGNS ALWAY
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570 DRAW"BM78,100S8C1"+L$(19)+L$
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":GOSUB315
580 JK$=" THEY SHOW THE FASTEST
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585 GOSUB560:DRAW"BM106,40S8C1"+
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590 JK$=" OTHER TIMES THEY MAY H
AVE WRITTEN DIRECTIONS.":GOSUB31
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595 PCLS4:COLOR2,3:LINE(0,0)-(25
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Photographing a CRT Screen

By Marty Goodman and Fred Cisin

It is relatively easy to get nice *hard copies* (printouts) of one's black-and-white drawings done on a computer. Screen dumps to dot matrix printers produce quite excellent copy in most cases, but getting hard copies of color images is considerably more difficult.

Black-and-white dot matrix printers are very common and can be had for relatively low cost. And if one buys a printer that is Epson compatible, one can be assured that all common graphic screen dumps will work reasonably well with it.

Color printers are expensive, available in only a few models, and extremely slow. Worse yet, *no* color printer available for under $1,000 can be made to display the full 64-color palette of the CoCo 3 (or even all of the nuances of artifact color patterns of the CoCo 2) even with the best of screen dump programs. For the present, the only

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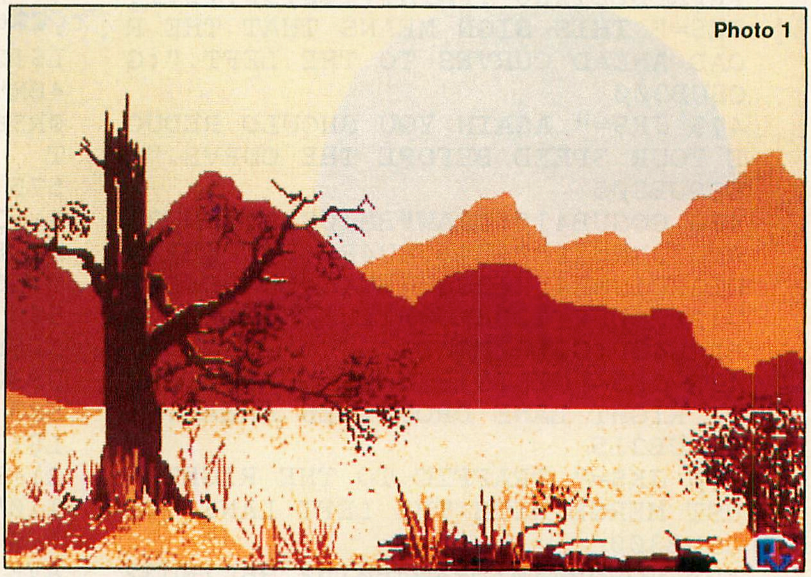
Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

Fred Cisin is formally trained in Computer Sciences and photography. He created the company Xenosoft, which produces Xenocopy *(a file conversion program for alien file formats) and* Xenofont *(a screen capture and print package) for the IBM PC. Fred is also on the faculty of Merit College, where he teaches Computer Sciences.*



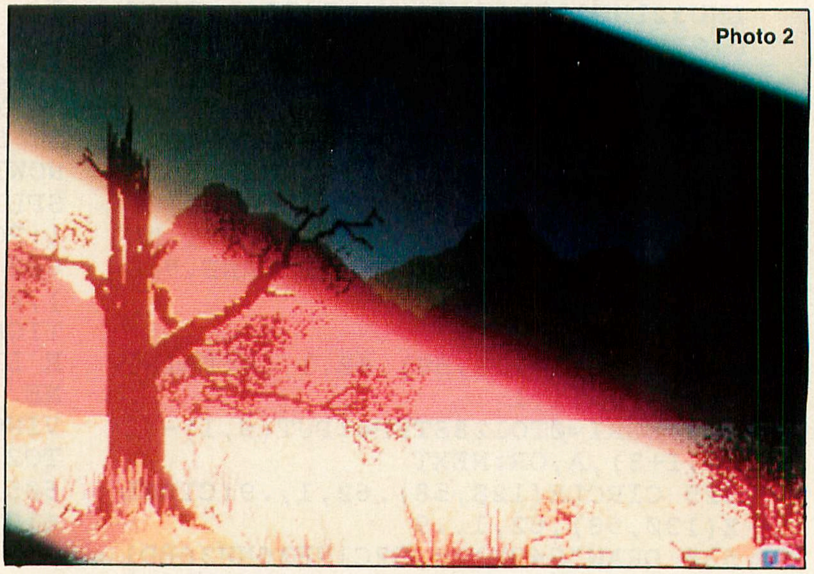


Photo 1: This desert scene photo shows a proper exposure. 1s @ f8,100mm. **Photo 2:** This photo was taken with a shutter speed of $^{1}/_{125}$th second (f2.0). In addition to showing the normal effects of too high a shutter speed, the photo shows the artifact of the focal-plane shutter mechanism (diagonal shadow).

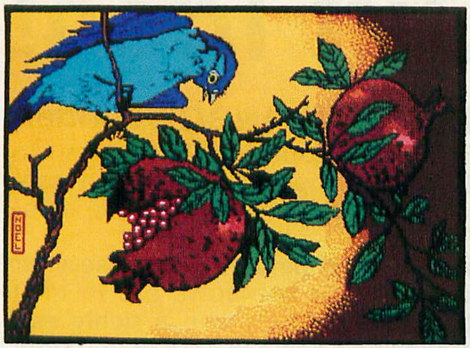


Photo 3

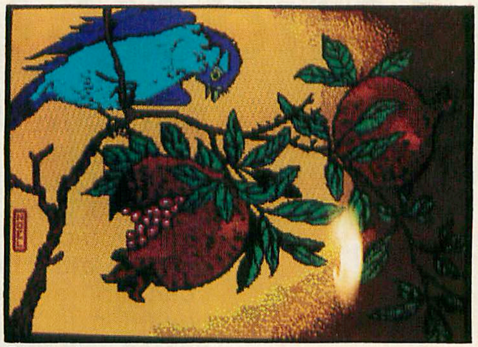


Photo 4

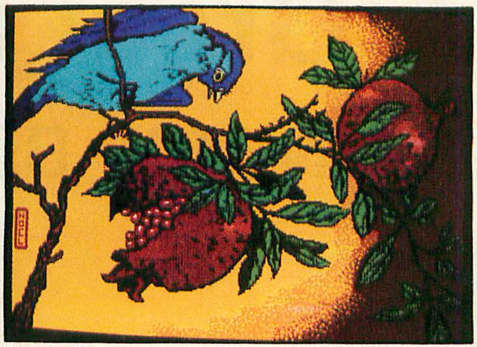


Photo 5

Photo 3: A proper exposure taken at 1s, f5.6 with a 100mm lens. **Photo 4:** This image has been marred by the glare and reflection of a desk lamp. The glare, however, is not always so obvious. Sometimes it appears as uneven shadowing which makes the picture look as though you are viewing it through shallow water. 1s @ f5.6, 100mm. **Photo 5**: This photo, taken with a 28mm lens, shows the effects of fish-eye distortion. ¼s @ f5.6. Tight cropping, however, almost eliminates this distortion.

means of getting accurate hard copy of color art is photographing the color monitor displaying the picture.

This article is addressed primarily to owners of 35mm single-lens reflex cameras. A camera that allows some degree of manual control is required. You will not be able to use the "program" mode of the newest, highly automatic 35mm SLR cameras. Instead, you will be using either a shutter speed or aperture-preferred mode of automatic operation, or a fully manual mode. Where focal lengths of lenses are given, remember that they are for 35mm film systems. Owners of other systems will have to make appropriate adjustments. Those with Polaroid cameras allowing through-the-lens focusing will be able to make use of much of the advice here, but will need some means of exposure control — possibly via filters that cut down light entering the camera. We will also briefly discuss the techniques used for ultra-high resolution transfer of computer images to film, such as those used in movie production studios.

How To Do It

There are several elements of successfully photographing a monitor: exposure, focus, focal length and anti-stray light measures used. The exposure itself can be broken down into contributing factors of shutter speed, film speed and aperture.

Shutter Speed

In photographing a monitor you must use a relatively long shutter speed. We recommend using a speed of between a quarter of a second and two seconds. Why?

Pictures are drawn a line at a time on the screen of a monitor. As an electron beam traces across the screen, the beam's intensity is varied. Accordingly, the brightness with which the phosphor lights up on the screen where the beam hits varies. On most monitors a picture is traced in $^1/_{16}$th of a second.

The instant after a bit of phosphor is excited by the beam it begins to fade. On some monitors this fading occurs rapidly and on others it is a bit slower. This is referred to as short vs. long persistance phosphor. You may have noticed on some green monochrome monitors that when the screen is cleared, the ghost of the previously displayed image remains for a moment. On most monochrome amber screen monitors this does not happen, because the most commonly used green phosphor tends to be a bit longer in its persistance than the most commonly used amber phosphor. Very short persistance phosphors fade so rapidly that the image may appear to flicker, causing eyestrain. Very long persistance phosphors cause annoying ghosting when their display is changing rapidly.

Let's see what happens if we try to use a $^1/_{250}$th of a second shutter speed to photograph a monitor. In that time only a quarter of a full image can be traced on the monitor. Thus, what the camera will see is a quarter of the image appearing *very* bright, for it was just traced, and the remainder of the picture looking quite dim, for all that the camera is seeing is the fading phosphorescence of the screen from the previous trace.

What happens if you use a shutter speed of $^1/_{30}$th of a second? This is roughly enough time for two pictures to be traced on the screen. The key word here is *roughly*. Only exceedingly expensive camera shutter speed settings are likely to be exact to more than + or – 20 percent. Thus, the camera will see between $1^4/_5$ and $2^1/_5$ frames traced. The result is that a narrow band on the picture will be either especially bright or especially dim, depending on which direction the camera's shutter speed is in slight error.

The solution is to use an especially long shutter speed. If you shoot at one second exposure you will be photographing 60 full frames. Although the last of those frames will be cut off at some random point, the inequality in exposure for that part of the film will be only $^1/_{60}$th of the total exposure, so no bright or dark bands will be seen in the picture.

The use of so long an exposure also eliminates the distortions caused by the operation of focal plane shutters. Note that in order to take a proper picture at this long a shutter speed, you *must* use a tripod or other solid means of anchoring the camera, and a means of tripping the shutter that will not jostle the camera. This means either using a cable release or using the self timer on the camera.

Film Speed

In order to allow use of a relatively slow shutter speed we need to use a relatively slow film speed. We recommend ASA 100 or slower. You may want to experiment with your camera's internal meter to see what sort of speed film it wants in order to take a proper picture of your monitor at the recommended slow shutter speed.

Professional photographers will be aware that shooting at shutter speeds as slow as one second slightly alters the color balance of the resulting picture. However, such "reciprocity failure," as the pros call this effect, will not be very significant, and, in any case, will affect the colors far less than variations of color display caused by the particular monitor used and by the settings of the controls on a given monitor.

Aperture

One wants to have a lot of depth of

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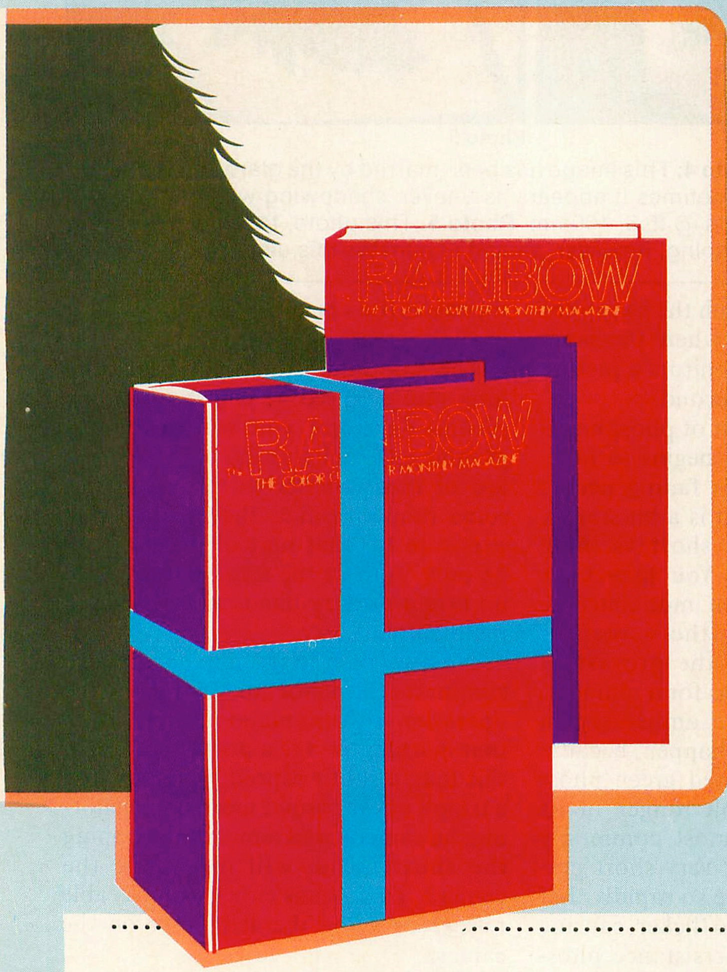
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field. In order to get this one must use a small aperture (high f number). We recommend f5.6 or greater. You may end up choosing the precise value based on what will be said next about focusing and depth of field.

Examine the diagram (Figure 1). You will see that the distance from the center of a monitor to the camera is less than the distance from the edge of a monitor to the camera. Because of this, if you focus on the center of your monitor, the edges of the monitor may be out of focus, or vice versa. This effect is compounded by the fact that many monitors have edges that curve away from the center.

There are two simple solutions to this problem. One is to choose a sufficiently high f value (small aperture) so that the camera has great enough depth of field to get both the edge and center of the monitor in focus. Most 35mm SLR cameras have a depth of field preview option that allows viewing the image as it will be seen by the film, at the f stop that will be used to take the picture. This option is useful in confirming you have selected a sufficiently high f number opening to provide for adequate depth of field.

Note that the closer you are to the monitor, the greater the discrepancy between camera to monitor center vs. camera to monitor edge distances. Another approach is choosing a longer focal length lens that allows shooting further from the monitor.

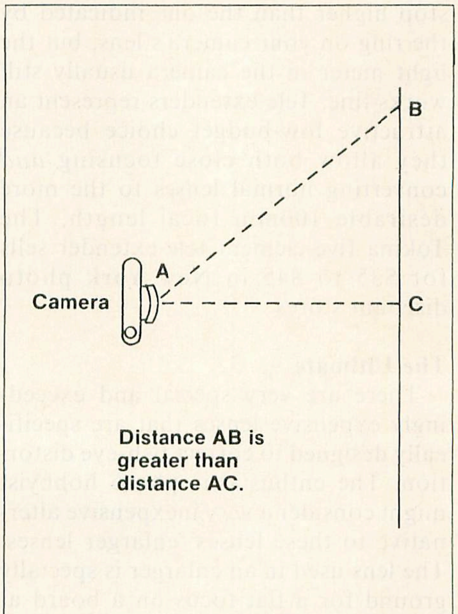
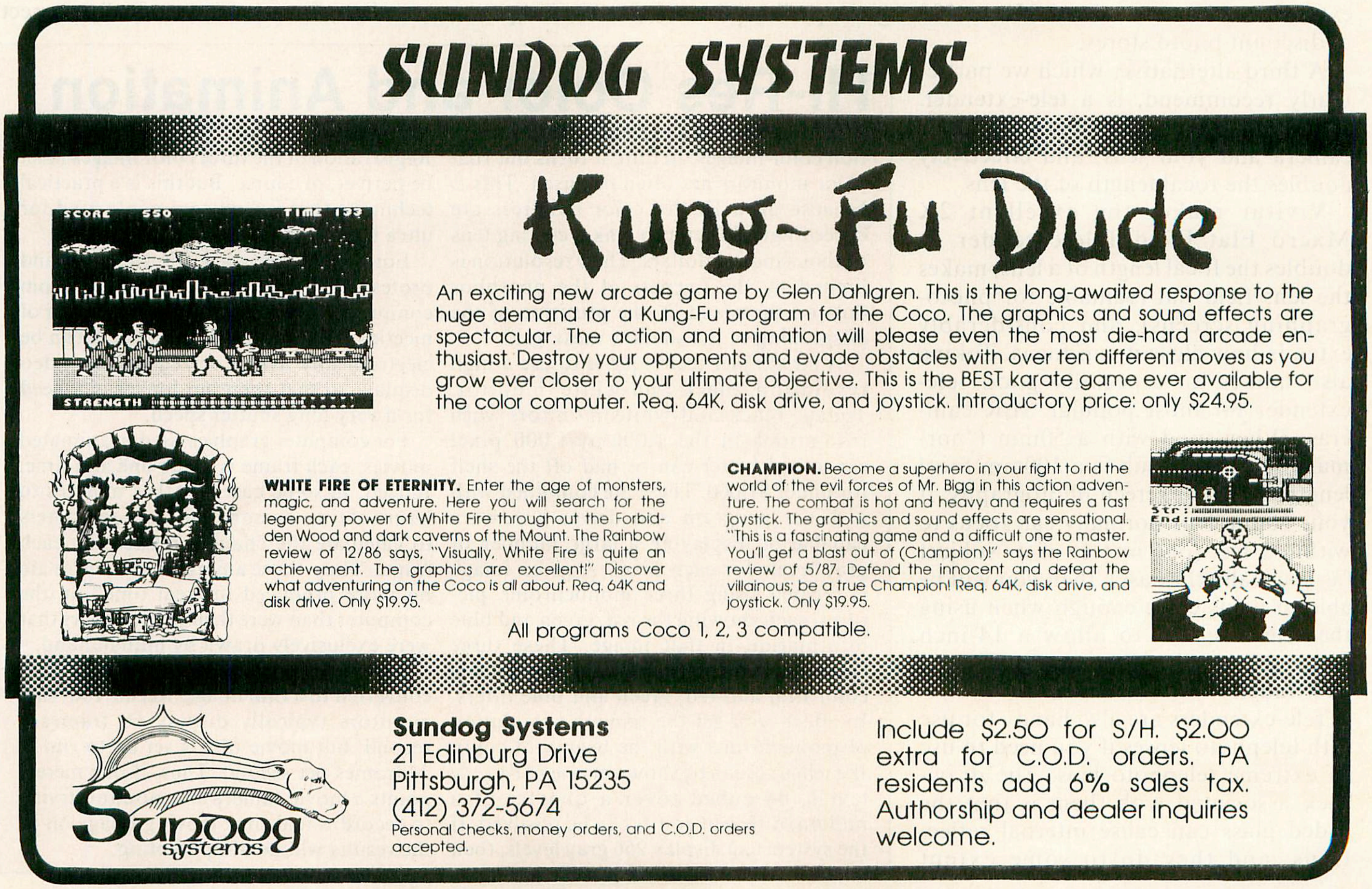


Figure 1

Focal Length

We recommend using a medium telephoto lens (75 to 120 mm) to photograph a monitor. While a 50mm lens will do, the problem is that in order to focus close enough to the monitor so that its screen fills the camera, *you will* often end up so close to it that the resulting image will show fish-eye distortion. Actually, *all* things when viewed close up necessarily show fish-eye distortion. In the human image processing system, however, complex pre-processing in the brain filters that fish-eye effect out, so we usually do not perceive images viewed close up by our eyes as having fish-eye distortion. Such image "correction" is not done within a camera. If you use a medium telephoto lens, you can get further from the monitor, and the resulting image on film will be flatter. If you use much more than a 120mm lens, you will find it difficult getting adequate depth of field and stabilizing the camera properly for the exposure. Sharpness will also suffer.

Many ordinary lenses will not be able to focus closely enough to the monitor to let the image fill the screen. The solution is to use a macro or close focusing lens. These lenses are optimized for focusing close to objects, and allow you to get within inches of your subject. Note that the newer "do every-


SUNDOG SYSTEMS

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thing" lenses (wide angle, telephoto, and close focusing all in one lens) may cause problems due to internal reflections in their numerous internal glass elements. A simple, dedicated 100mm macro lens would likely be better, for it tends to have only three to five pieces of glass in it, compared to the 13 or more in modern, multiple purpose lenses.

Two far less expensive (and nearly equally effective) alternatives to using a macro lens are to use a lens extender or a "portra" (add-on close-up lens). If using extension tubes on your 35mm camera, try to get tubes that preserve the light meter operation of the camera. Get the smallest available size extension tube. You do *not* want to use a long tube or, worse yet, an extension bellows. They are for postage stamps and insects. The #2 portra lens is likely to be the right one for you.

You may want to experiment in the store before deciding on what portra lens or extension tube to buy. Take along a piece of cardboard the size of your monitor screen to facilitate such experimentation. Select a portra lens or extension tube that permits you to focus sharply on the "target" cardboard at a point where it just completely fills the camera's viewfinder. Portra add-on lenses cost about $10 to $20 and the extension tube costs about $20 to $30 at discount photo stores.

A third alternative, which we particularly recommend, is a tele-extender. This device is placed between your camera and your lens, and effectively doubles the focal length of the lens.

Vivitar makes the excellent 2X Macro Flat Field Tele-extender. It doubles the focal length of a lens, makes the lens field flat (valuable for photographing screens), and considerably extends how close it can focus. Tokina also makes an especially good tele-extender for most popular SLR cameras. When used with a 50mm ("normal") lens, the result is a 100mm focal length, ideal for screen photography. If your 50mm lens normally can focus to within 3 feet (one meter) of its subject (as is usually the case), then you will be able to focus close enough when using the tele-extender to allow a 14-inch diagonal monitor screen to fill the viewfinder.

Tele-extenders are also handy for use with telephoto lenses if you need to use an extreme telephoto lens. The drawback associated with them is that the added glass can cause internal reflections, and they do to some extent degrade image quality. But modern, high quality tele-extenders like the Tokina five-element model offer quite good optical performance.

Note that using a tele-extender will cause the actual f stop you use to be one stop higher than the one indicated by the ring on your camera's lens, but the light meter in the camera usually still works fine. Tele-extenders represent an attractive low-budget choice because they allow both close focusing *and* converting normal lenses to the more desirable 100mm focal length. The Tokina five-element tele-extender sells for $35 to $45 in New York photo discount stores.

The Ultimate

There are very special and exceedingly expensive lenses that are specifically designed to correct fish-eye distortion. The enthusiastic photo hobbyist might consider a very inexpensive alternative to these lenses: enlarger lenses. The lens used in an enlarger is specially ground for a flat focus on a board at close range. This is exactly the sort of lens we would like for photographing a monitor in a distortion-free fashion. If you are competent to mount such a lens on your camera, you will have an inexpensive ideal lens for photographing monitors. Of course, you will have to give up all aspects of automatic operation of your camera if you try this approach.

Stray Light Prevention

When you look at a monitor, you usually don't notice the mild to moderate amount of glare and reflections present from the monitor's surface. The camera will see all of this, though, and your first attempts at photographing a monitor might be quite disastrous, for the image could be virtually lost in a sea of reflected images from around the room.

To prevent stray light, you must photograph the monitor in a darkened room. Preferably, you should put the camera and monitor under a black cloth or conical black cardboard hood to completely eliminate stray light and reflected room images. Even so, you still can have problems with reflection of the lens of the camera. We recommend, if you are quite serious about this, that you black out with a felt tip pen or paint the white lettering that surrounds your camera's lens. The lettering has been known to cause visible reflections in screen photos.

Color Balance and Phosphor Dots

Most color monitors have images that are somewhat bluish overall. We tend not to notice this when viewing the monitor, for we automatically correct

Hi-Res Color and Animation

When folks want extremely high resolution color images on film, it turns out that color monitors are often *not* used. This is because ultra Hi-Res color monitors are exceedingly difficult to make, costing tens of thousands of dollars. Their resolution is limited by the fineness of the phosphor dots on them and by the precision of the positioning of the shadow mask grid.

A far simpler technique is to use a high resolution black-and-white monitor. Today, black-and-white monitors with resolutions in the 1,000-by-1,000 pixel range and better can be had off the shelf for under $1,000. These are combined with a driver program and driver hardware capable of displaying a large number of gray levels for each pixel. A given image is created using three monochrome pictures, each showing the red, green and blue information in that image. These three components are then photographed using color film and red, green and blue filters. In effect, you get the immense resolution of monochrome with the beauty of color. If each pixel can be shown at one of 64 gray levels, 64 cubed (over a quarter of a million) different colors can be resolved. If the system can display 256 gray levels, then it can resolve over 16 million colors. Registration of the three color images must be perfect, of course. But this is a practical technique that is very commonly used for ultra high resolution color imaging.

Equipment designed for frequent and professional creation of film images from computer images incorporates a number of niceties. The shutter on the camera can be electronically synchronized to the video display, so that there no longer is a need for a very long shutter speed.

For computer graphics used in animated movies, each frame is made one at a time. Indeed, in some cases it takes minutes to hours of time on immense Cray computers to calculate the changes needed for each frame. Thus, those animated sequences are no more produced in "real time" on the computer than were their predecessors that were exclusively drawn by human hand.

After each new frame is ready, it is converted to a film image. Recall, too, that monitors typically display 60 frames a second, but movie film is set up to run at 24 frames per second. Thus, if one merely points a movie camera at a monitor, trying to record a real-time moving image on it, the results will be disappointing. ☐

for it. But photos of color monitors may appear bluish. Ektachrome film is most likely to have this problem, for it tends to yield slightly bluish pictures to begin with. We suggest using Kodacolor (print) or Kodachrome (slide) film. If you still find your pictures appearing unacceptably bluish in areas that should be white, you might want to experiment with using filters on your camera to correct this. Slight bluishness might be corrected by a skylight (1A) filter. FLD filters, used to correct for fluorescent lighting, might be of help with more severe bluish cast problems.

Of course, it is quite possible to make needed color corrections when the negative is developed and printed, in the darkroom. One merely experiments with various filters until a part of the image that is supposed to be white is indeed properly rendered as white. But if you want this done for you by a professional printing service, you will find such custom corrections cost a great deal. Unless you do your own color printing, you will find it far less expensive to attempt to make any needed corrections by using a filter on the camera at the time you take the picture.

If you focus sharply on the monitor, you might find that your photos show the individual phosphor dots that compose the face of a color monitor. This effect can be either pleasing or annoying, depending on the image in question. To eliminate this effect, you may wish to deliberately make the image just slightly out of focus. This can be done at the time you take the picture, or at the time the picture is printed. Professionally, it is best to take a sharp picture and then, if need be, put it out of focus at the time of printing. But as with the filters, unless you do your own printing, you may find it economical to make the camera out of focus at the time the picture is taken. We recommend that you also take a similar picture in sharp focus at the same time.

In the case of screen photos that are published in magazines, a very sharp image showing the phosphor dots on the monitor can cause Moire patterns when the pattern of dots on the monitor photo interacts with the pattern of dots used to render the color picture in the magazine printing process. It is for this reason that photos for publication in RAINBOW are often deliberately put very slightly out of focus, to eliminate the dot pattern of the monitor screen from the photo image.

Summary

For proper screen photography, we recommend:

1) shutter speed of ½ to 2 seconds
2) small aperture (f5.6 or higher)
3) a close focusing, moderate telephoto lens
4) a hood to keep out stray light

If you follow this advice, you should be able to take quite excellent, nearly professional, color or black-and-white pictures of your monitors. If you find there is undesirable fish-eye distortion, and if you are a photo hobbyist, do consider adapting an enlarger lens to your camera. Using one will likely give you truly professional quality screen photos.

In the examples we show photos of a monitor where all of the important details are taken care of. We also show photos where the shutter speed is too short for a proper image, where the image is marred by glare, and where annoying fish-eye distortion (due to deliberate use of a wide angle lens) is present.

MLBASIC 2.0 - BASIC Compiler

The wait is over. WASATCHWARE announces the latest version of MLBASIC designed to allow more compatibility with existing BASIC programs than ever available before for the Color Computer. This version also allows full use of the capabilities and memory of the CoCo 3. Written in machine language, MLBASIC can compile programs as large as 64K bytes. Standard floating point (9 digit precision), INTEGER, and String type variables and arrays supported.

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HPOINT INSTR INT LEN LOG LPEEK LOC LOF
PEEK POINT PPOINT RND SGN SIN SQR TAN
TIMER VAL VARPTR
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CHR$ INKEY$ LEFT$ MID$ MKN$ RIGHT$ STR$ STRING$
5. Graphic/Screen commands
ATTR COLOR CLS CIRCLE DRAW HCOLOR HSCREEN HDRAW
HLINE HPAINT HPRINT HRESET HCIRCLE HCLS HSET JOYSTK
LINE LOCATE PALETTE PAINT PCLEAR PCLS PLAY PMODE
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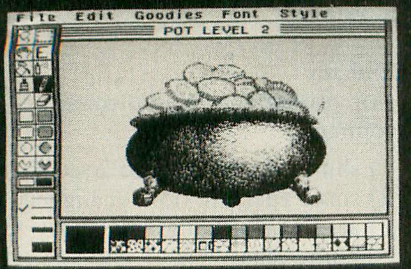
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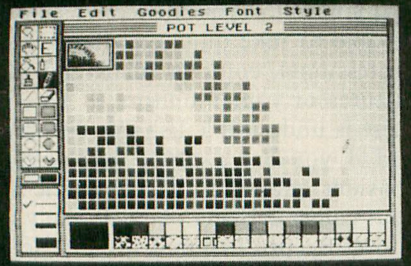

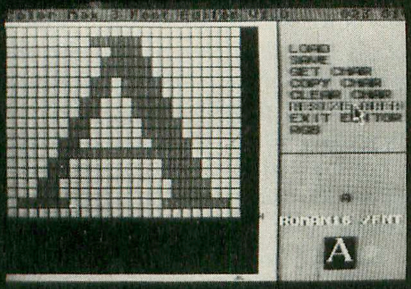

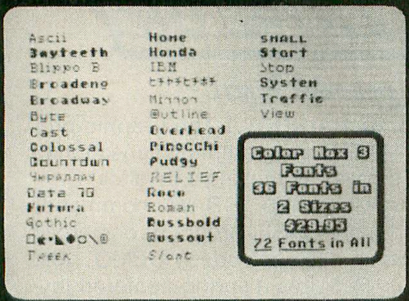

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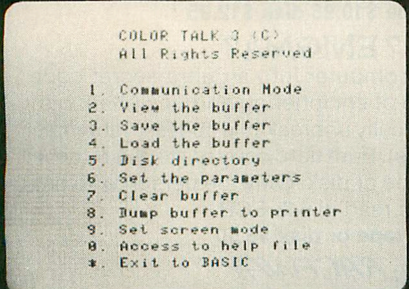

```
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1. Communication Mode
2. View the buffer
3. Save the buffer
4. Load the buffer
5. Disk directory
6. Set the parameters
7. Clear buffer
8. Dump buffer to printer
9. Set screen mode
0. Access to help file
*. Exit to BASIC
```

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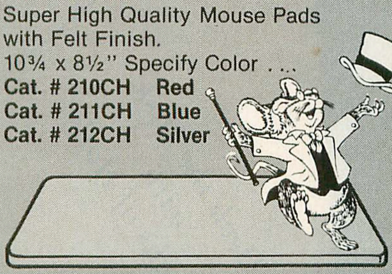

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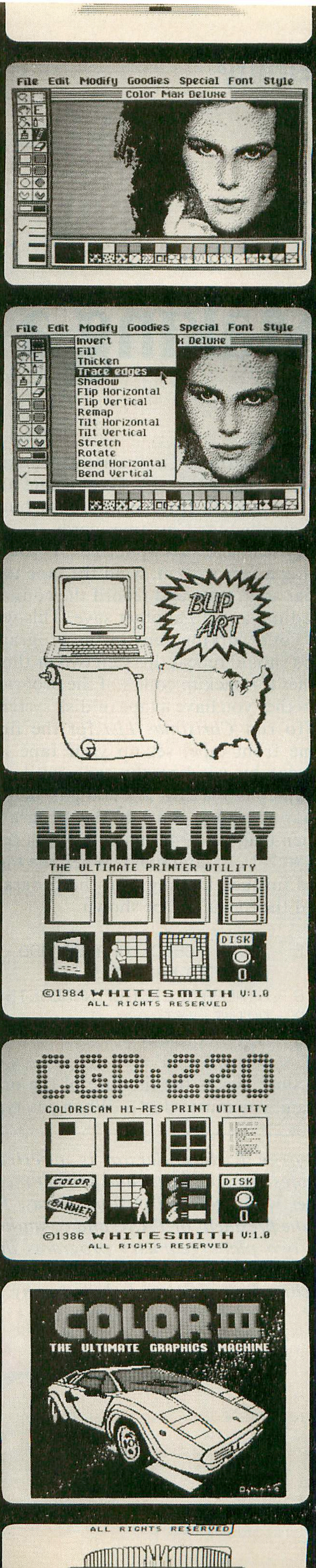
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File Edit Modify Goodies Special Font Style
Invert
Fill
Thicken
Trace edges
Shadow
Flip Horizontal
Flip Vertical
Remap
Tilt Horizontal
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File away important information

Making a Christmas Address List

By G.F. Saunderson

Christmas List is a BASIC program that will keep a file of names and addresses for any purpose, but it is intended for Christmas cards.

Type in and save `XMASLIST`. If you're using a tape system, wind the tape to a clear spot, note and record the counter reading, and do another save. This will be your working copy of the program. You should repeat this step two or three times for backup copies of the program whether you have a tape or disk system.

To run *Christmas List* for the first time from tape, set up your tape recorder by winding the tape until the counter is reading a few digits before your working copy of the program. Then load the program with the `CLOAD "XMASLIST"` command. When the tape has finished loading, run the program and the menu will be shown:

```
E - EDIT (CHECK/CHANGE/ADD OR
    DELETE) NAMESETS
G - GENERATE LIST OF NAMESETS
P - PRINT LIST
Q - QUIT PROGRAM
```

Since this is the first use of the program, you must select `G`. When you type in `G` you will be asked for an eight-letter name for the list. Type in something like `MYLIST87` and press ENTER. You will be asked to enter the first name of your list. When prompted, enter the street address, the city, the state and the ZIP code. You will then be asked if you want to enter another name and address. If you answer yes, the input process is repeated. If you answer no, the program proceeds to save the list. Be sure you have a data tape or disk ready before typing No.

George F. Saunderson is a retired professional engineer and project manager who lives in Houston, Texas. He is the president of TASC and co-author of two plane geometry programs distributed by TASC. His other interests include ham radio and photography.

Deck the Disk
with
Boughs of Holly!
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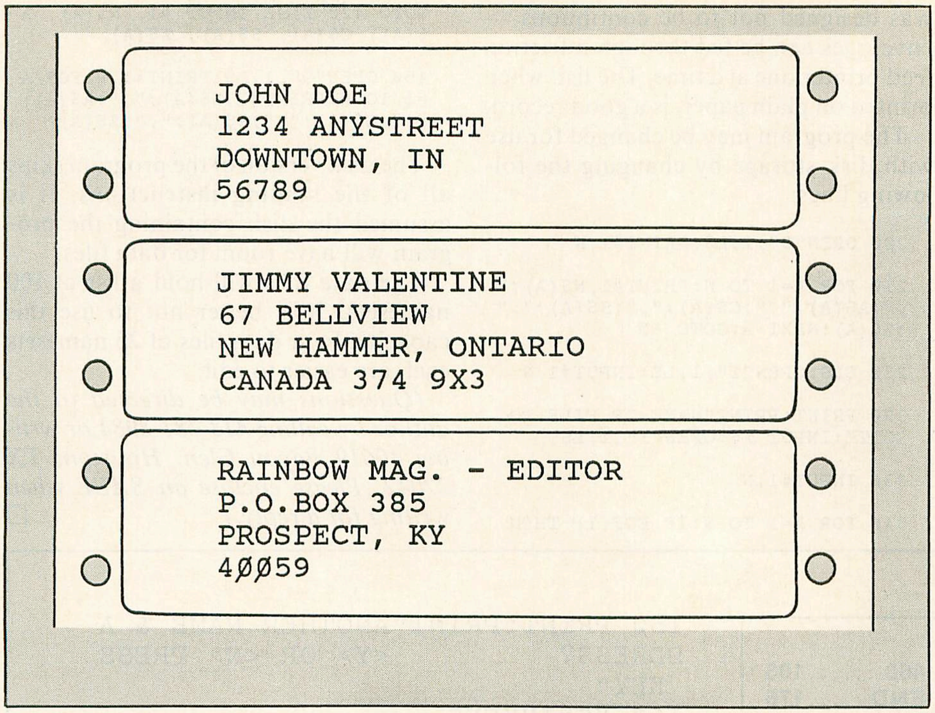
22



```
JOHN DOE
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DOWNTOWN, IN
56789

JIMMY VALENTINE
67 BELLVIEW
NEW HAMMER, ONTARIO
CANADA 374 9X3

RAINBOW MAG. - EDITOR
P.O.BOX 385
PROSPECT, KY
40059
```

When entering data, keep each line to 35 characters or less, and do not use commas in any line. If you must use a delimiting mark, use a hyphen.

If your address uses "c/o" it must be worked into the name line or into the street address line, or both.

The ZIP code line may be expanded for foreign countries if necessary, e.g., Canada H2A 3C4.

Once a list has been filed on tape or disk, it may be edited. If you select `E` from the menu, you are asked for the name of the file you want to edit, and instructions are given on loading the list from your data tape. When loading is complete, the first nameset will be displayed with the notation:

```
<0> THIS IS OK
<C> THIS NEEDS CHANGING
<D> DELETE THIS NAMESET
```

If you type `0` the next nameset will be shown. If you type `C` you will be asked to input new data. After the new data has been entered, the next nameset will be shown.

If you type `D` the current nameset will be deleted. The numbers of all succeeding namesets will be decreased by 1. If you delete the first nameset of a long list, this renumbering step can take an appreciable amount of time.

When you reach the end of the list, you will be asked if you want to add a new nameset. If `Y` is selected you will be asked to input the data. If `N` is selected, prepare your data tape or disk for the corrected list to be saved.

If you want to make a backup copy of your list, you may do so by editing the list — typing in `E` and answering all namesets with `0` (and then allowing the backup to be saved at a new location on

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the data tape, if you're using a tape system).

The list may be printed by selecting P from the menu. You will be asked for the name of the file and given instructions on loading the list. After you load it, the printer will print the first nameset and show the message PRINTING-*xxxxxxxx*, where *xxxxxxxx* is the nameset name. The screen prompts you for the next nameset. Pressing ENTER causes the next nameset to be displayed on the screen and printed. This continues until the entire list has been printed.

The printing function was designed to print tractor feed labels, single width, 1-by-3½ inches. The printing process was designed not to be continuous — envelopes can be fed through a friction feed printer one at a time. The list, when printed on plain paper, is a good record.

The program may be changed for use with disk storage by changing the following lines:

```
200 OPEN"O",1,L$:PRINT#1,N

210 FOR A=1 TO N:PRINT#1,N$(A);"
,";A$(A);",";C$(A);",";S$(A);","
;Z$(A):NEXT A:GOTO 60

230 CLS:OPEN"I",1,L$:INPUT#1,N

320 PRINT:PRINT"NAME OF FILE TO
EDIT":INPUT L$:OPEN"I",1,L$

330 INPUT#1,N

340 FOR A=1 TO N:IF EOF(1) THEN
GOTO 420 ELSE INPUT #1, N$(A), A
$(A), C$(A), S$(A), Z$(A)

450 OPEN"O",1,L$:PRINT#1,N:FOR A
=1 TO N:PRINT#1,N$(A);",";A$(A);
",";C$(A);",";S$(A);",";Z$(A)
```

The disk version of the program skips all of the loading instructions. It is assumed the disk containing the program will have room for data files.

The data files will hold a list of 100 namesets. It is better not to use this capacity. Four data files of 25 namesets each are easier to edit.

(Questions may be directed to the author by calling 413-781-8984 or writing 10619 Bayou Glen, Houston, TX 77042. Please enclose an SASE when writing for a reply.) ☐

140	136	460	103
230	240	END	176
350	121		

The listing: XMASLIST

```
10 REM ***XMAS CARD LABEL  PRINT
ING PROGRAM - TAPE VERSION ***
20 REM ***TITLE "XMASLIST/TAP" *
**
30 REM *** (C) BY GEORGE SAUNDER
SON - HOUSTON, TX 1987 ***
40 CLEAR 10000:DIM N$(100), A$(1
00), C$(100), S$(100), Z$(100)
60 CLS:CLOSE:PRINT"
  MENU":PRINT"               ===
="
70 PRINT" E - EDIT (CHECK/CHANGE
/ADD OR       DELETE) NAMESETS":
PRINT" G - GENERATE LIST OF NAME
SETS":PRINT" P - PRINT LIST":PRI
NT" Q - QUIT PROGRAM":PRINT:PRIN
T" PRESS KEY OF YOUR CHOICE"
80 X$=INKEY$:IF X$="E" THEN GOTO
 320
90 IF X$="G" THEN X$="":L$="":N=
0:GOTO 130
100 IF X$="P" THEN X$="":GOTO 22
0
110 IF X$="Q" THEN X$="":GOTO 31
0
120 IF X$<>"G" OR X$<>"P" OR X$<
>"Q" THEN GOTO 80
130 PRINT:PRINT"8-LETTER NAME OF
 THIS LIST   ":INPUT L$
140 CLS:N=N+1:PRINT"NAME":INPUT
N$(N):PRINT"STREET ADDRESS":INPU
T A$(N):PRINT"CITY":INPUT C$(N):
PRINT"STATE":INPUT S$(N):PRINT"Z
IP CODE":INPUT Z$(N)
150 PRINT:PRINT"ANOTHER NAME & A
DDRESS?         <Y> OR <N> PRESS
 KEY"
160 X$=INKEY$
170 IF X$="Y" THEN X$="":GOTO 14
0
180 IF X$="N" THEN X$="":GOTO 20
0
190 IF X$<>"Y" OR X$<>"N" THEN G
OTO 160
200 CLS:PRINT"WIND DATA TAPE TO
FRESH TAPE-   NOTE COUNTER READI
NG":PRINT"SET RECORDER TO RECORD
":GOSUB 540:CLS:PRINT"RECORDING
";L$:OPEN"O",#-1,L$:PRINT#-1,N
210 FOR A=1 TO N:PRINT#-1,N$(A);
A$(A);C$(A);S$(A);Z$(A):NEXT A:G
OTO 60
220 PRINT:PRINT"FILENAME OF CARD
 LIST TO BE     PRINTED":INPUT L
$
230 CLS:PRINT"SET DATA TAPE TO B
EGINNING OF ":PRINT L$:PRINT"SET
 RECORDER TO PLAY":GOSUB 540:CLS
:PRINT"PRINTING ";L$:OPEN"I",#-1
,L$:INPUT#-1,N
240 FOR A=1 TO N
250 INPUT#-1, N$(A),A$(A),C$(A),
S$(A),Z$(A)
260 PRINT:PRINT"PRINTING ";N$(A)
270 PRINT#-2:PRINT#-2,N$(A):PRIN
T#-2,A$(A):PRINT#-2,C$(A);:PRINT
#-2,", ";:PRINT#-2,S$(A):PRINT#-
2,Z$(A):PRINT#-2
280 PRINT:PRINT"PRESS <ENTER> FO
R NEXT LABEL";:INPUT Z
290 NEXT A
300 PRINT:PRINT"END OF FILE - <E
NTER> FOR MENU";:INPUT Z:GOTO 60
310 PRINT:PRINT"THAT'S ALL FOLKS
 ! ! !":END
320 PRINT:PRINT"NAME OF FILE TO
```

```
EDIT":INPUT L$:CLS:PRINT"SET DAT
A TAPE TO BEGINNING OF ":PRINT L
$:PRINT"SET RECORDER TO PLAY":GO
SUB 540:OPEN"I",#-1,L$
330 INPUT#-1,N
340 FOR A=1 TO N:IF EOF(-1) THEN
 GOTO 420 ELSE INPUT #-1, N$(A),
 A$(A), C$(A), S$(A), Z$(A)
350 CLS:PRINT:PRINT:PRINT L$;" N
AMESET NO.";A:PRINT
360 PRINT N$(A):PRINT A$(A):PRIN
T C$(A);", "; S$(A):PRINT Z$(A)
370 PRINT:PRINT" <O> THIS IS OK"
:PRINT" <C> THIS NEEDS CHANGING"
:PRINT" <D> DELETE THIS NAMESET"
380 X$=INKEY$:IF X$="O" THEN X$=
"":GOTO 410
390 IF X$="C" THEN X$="": GOTO 4
30
395 IF X$="D" THEN GOTO 530
400 IF X$<>"O"OR X$<>"C" OR X$<>
"D" THEN GOTO 380
410 IF A=N THEN GOTO 470 ELSE NE
XT A
420 GOSUB 540:CLOSE:GOTO 450
430 PRINT:PRINT"NAME":INPUT N$(A
):PRINT"STREET ADDRESS":INPUT A$
(A):PRINT"CITY":INPUT C$(A):PRIN
T"STATE":INPUT S$(A):PRINT"ZIP C
ODE":INPUT Z$(A)
440 NEXT A
450 CLS:PRINT"WIND DATA TAPE TO
FRESH TAPE-   NOTE COUNTER READI
NG":PRINT"SET RECORDER TO RECORD
":GOSUB 540:CLS:PRINT"RECORDING
";L$:OPEN"O",#-1,L$:PRINT#-1,N:F
OR A=1 TO N:PRINT#-1,N$(A);A$(A)
;C$(A);S$(A);Z$(A)
460 NEXT A:CLS:GOTO 60
470 PRINT:PRINT"ADD A NEW NAMESE
T? <Y> OR <N>"
480 X$=INKEY$:IF X$="N"THEN CLS:
GOTO 420
490 IF X$="Y"THEN GOTO 510
500 IF X$<>"Y"OR X$<>"N" THEN GO
TO 480
510 N=N+1:CLS:PRINT"NAME":INPUT
N$(N):PRINT"STREET ADDRESS":INPU
T A$(N):PRINT"CITY":INPUT C$(N):
PRINT"STATE":INPUT S$(N):PRINT"Z
IP CODE":INPUT Z$(N)
520 CLS:GOTO 470
530 FOR B=A TO N:N$(B)=N$(A+1):A
$(B)=A$(A+1):C$(B)=C$(A+1):S$(B)
=S$(A+1):Z$(B)=Z$(B+1):NEXT B:A=
A-1:N=N-1:NEXT A
540 PRINT@452,"PRESS <ENTER> TO
CONTINUE";:LINEINPUT Z$:RETURN
```

"I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."
The RAINBOW, July 1987

You've moved up to a CoCo 3. A powerful new machine. Now, it's time to give BASIC a shot in the arm, with ADOS-3. Wouldn't it be nice to turn on your machine and be greeted by an 80-column display, in the colors of your choice, with your own custom startup message? To run routinely at 2 MHz (double speed) without having to slow down for disk and printer operations? This and much, much more is possible with ADOS-3, our CoCo 3 adaptation of the acclaimed original ADOS, which shares the original's virtual 100% compatibility with commercial software. After customizing ADOS-3 using the provided configuring utility, you can have it burned into an EPROM that plugs into the Disk BASIC ROM socket, or just use it in RAM as a disk utility. (EPROM + burning will cost $15-20; we provide information concerning how you can have this done.) Supports double-sided drives (35, 40, or 80 tracks). FAST and SLOW commands, auto line number prompts, RUNM command, keystroke macros, arrow-key scroll through BASIC programs, auto-edit of error line, and many more valuable features.

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NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Winter Carnival

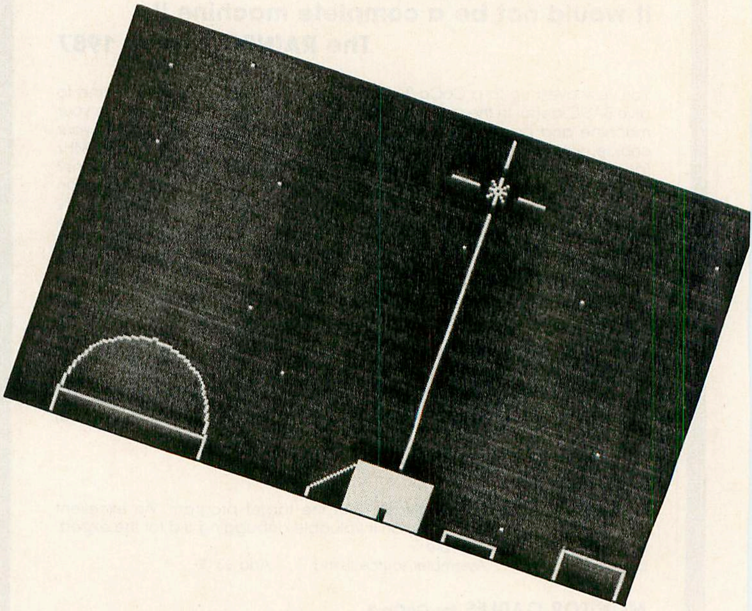
Holiday Graphics

16K
ECB

The Christmas Star

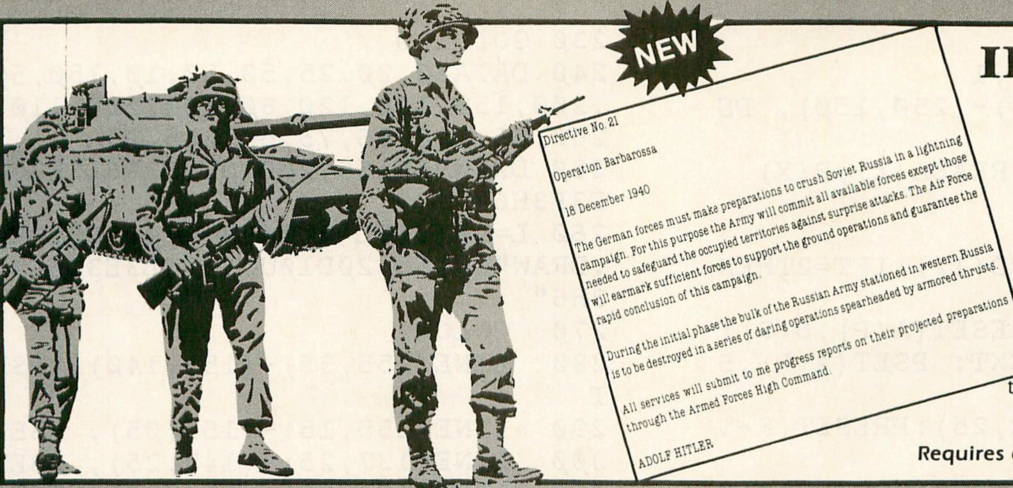
By Don Shortt and M.G. Duncan

We don't know whether the Christmas Star was a supernova explosion or an alignment of planets or something else entirely. But you can enjoy this transformation of a tiny star making its way to a point in the sky over a certain stable in Bethlehem.



The listing: XMASSTAR

```
10 '******************************
20 '    A CHRISTMAS CARD
        FROM M.G.DUNCAN AND
        DON SHORTT  1986
30 '******************************
40 DIMA(12),B(12)
50  PMODE4,1
60 SCREEN1,1
70 PCLS0
80  LINE(0,164)-(256,164), PSET
90  DRAW"BM124,164U5E15D19U20R30
D21L13U7L4D7"
100  LINE(180,164)-(200,158), PS
ET,B
110  PAINT(150,163),1
120  CIRCLE(50,154),30,,1,.5,0
130  LINE(20,164)-(80,154), PSET
```



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All services will submit to me progress reports on their projected preparations through the Armed Forces High Command.

ADOLF HITLER

IRON CROSS

War in Russia

by John & Michael Galus

The German invasion of Russia began at 0300 on 22 June 1941. Two massive armies faced each other in a titanic struggle which would decide World War II. The object of IRON CROSS is to defeat the Russian forces controlled by the computer & to take control of the Russian cities.

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Color Connection

modem communication software

by BJ Chambless

Color Connection for RSDOS and OS-9 Connection are the best in communication software. All standard protocols are supported, including CompuServe Protocol B, XMODEM, and XON/XOFF. The auto dial feature for Hayes compatible and some Radio Shack modems is supported. Macros allow easy entry of often-used passwords and ID's. 300, 1200, and higher baud rates supported. Communicate with confidence with this super modem software!

OS-9 version requires R232 Pak	**$49.95**
RSDOS versions (CoCo 2 & CoCo 3 incl)	**$49.95**

OS-9 Word Processing

Screen Star

by Scott Cabit

This excellent screen editor implements the popular WordStar editing capabilities on OS-9 & includes a unique Speller. Move, copy, or delete blocks of text with one keystroke. Powerful cursor commands allow fast, easy movement throughout the file. The find/replace command makes mass changes & searches a snap. Set tabs, toggle the video, access the OS-9 shell & define up to 10 function keys for fast repetitive functions. And it will edit files larger than memory too! Easy interface with Computerware's Text Formatter makes an exquisite word processing package!

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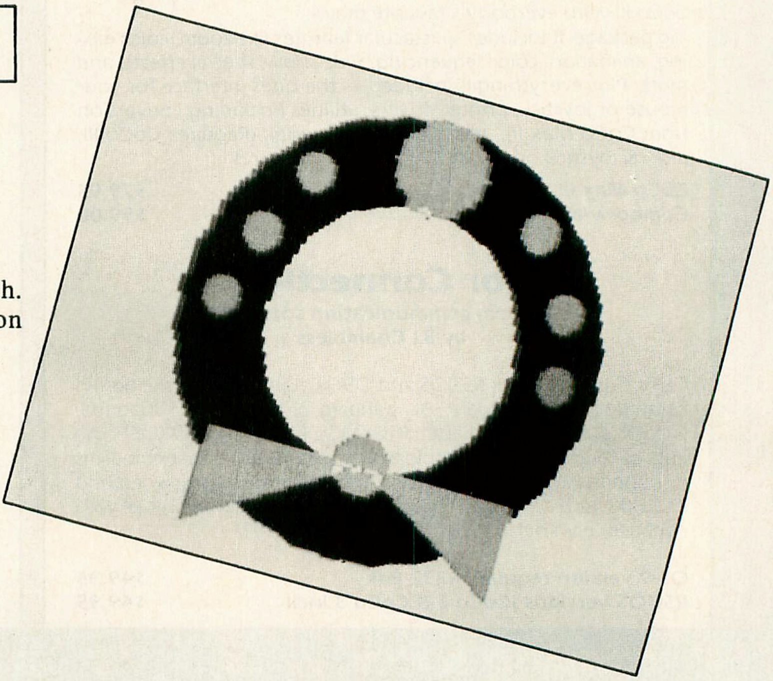
```
,B
140 PAINT(22,170),1
150  LINE(225,164)-(250,150), PS
ET,B
160  FORX=1TO12: READA(X),B(X)
170  NEXT
180 REM
190 T=RND(2):P=RND(12):IFT=2THEN
 PSET(A(P),B(P))
200 IFT=1 THEN PRESET(A(P),B(P))
: FORX=1TO222: NEXT: PSET(A(P),B
(P))
210 R=R+1: PSET(R,25):PRESET(R-1
,25)
220 IFR=155 THENR=154:GOSUB250:P
RESET(155,25)
230 GOTO190
240 DATA20,20,25,50,50,10,150,50
,200,150,100,120,80,100,225,110,
200,55,128,96,75,50,245,25
250 DRAW"BM155,20D10U5L3R6L3E3G6
E3F3H6"
260 L=L+1:IFL=2 THEN L=0: COLOR0
:DRAW"BM155,20D10U5L3R6L3E3G6E3F
3H6"
270  COLOR1
280  LINE(155,35)-(155,140), PSE
T
290  LINE(155,15)-(155,05), PSET
300  LINE(137,25)-(147,25), PSET
310  LINE(164,25)-(174,25), PSET
320  RETURN
```

16K
ECB

This Wreath Hangs Indoors

By Mark Bell

Christmas wouldn't seem like Christmas without a wreath. However, we do not suggest that you hang your monitor on your front door. Keep your CoCo close to the fireplace and think cozy holiday thoughts.



The listing: `WREATH`

```
5 REM**A WREATH WITH MUSIC**
10 PMODE3,1:PCLS:SCREEN1,1
20 CIRCLE(128,96),96
30 CIRCLE(128,96),58
50 CIRCLE(200,66),10
60 CIRCLE(180,36),10
70 CIRCLE(130,21),23
80 CIRCLE(76,36),10
90 CIRCLE(60,66),10
100 CIRCLE(50,96),10
110 CIRCLE(205,96),10
120 LINE(60,150)-(200,150),PSET
130 LINE(60,150)-(60,200),PSET
140 LINE(60,200)-(130,150),PSET
150 LINE(130,150)-(200,200),PSET
160 LINE(200,200)-(200,150),PSET
170 PAINT(105,17),2,4
180 PAINT(110,21),8,8
190 PAINT(76,36),8,8
200 PAINT(60,66),8,8
210 PAINT(205,96),8,8
220 PAINT(50,96),8,8
230 PAINT(200,66),8,8
250 PAINT(180,36),8,8
260 PAINT(175,50),2,4
400 CIRCLE(130,150),15
410 PAINT(125,145),8,8
420 PAINT(125,155),8,8
430 PAINT(145,155),8,8
440 PAINT(105,175),2,4
450 PAINT(80,175),8,8
460 PAINT(70,180),8,8
470 PAINT(180,150),8,8
490 PAINT(196,180),8,8
500 GOTO500
```

Data Master

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a new level of sophistication and ease of use in data base systems!

by BJ Chambless

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Simplify steps with pull-down menus

Throw down the shackles of rigid menu hierarchies and see how simple our pull-down menu system is to use. All options are available from anywhere in the program. So what if you're designing a report, if you want to change your access key you can do it right then and there without exiting back and forth through several levels of menus and options. To make it even simpler, each menu option can be invoked by a single character!

Dialog boxes

Pop-up windows display current settings (display, access, print) and available choices for fast changes of any option.

Unique LIST (spreadsheet) display format

A unique *LIST* display format lets you view data in easy-to-read rows & columns. Simply choose which elements from the record you want to see and **Data Master** displays them in a simple, one record per line, spreadsheet-like format.

From this easy-to-read screen you may edit your data right there, without having to exit the display menu, enter an edit menu, and edit each individual record. Mass changes are a snap!

For even more power, use an access key to selectively display a subset of records from your data base. Now you see only the chosen elements, in the chosen records, in a very simplified screen format – and can change them right on the screen!

Upload/Download with other software

Data Master can read and write standard sequential files which aids in data transfer between DynaCalc and many other programs.

OS-9 Profile & Data Bank Compatibility

Your OS-9 Profile and Data Bank files are compatible with the new power of **Data Master**. You won't lose any of your valuable data when you step up to **Data Master**!

Easy Expansion

Re-definition of records and transfer of files is made easy, allowing you flexibility when designing a new data base or when using an old one for new tasks.

Elements & Records:

Each record can contain up to 512 characters used within 35 elements. Elements are defined as: *alphanumeric* (descriptive data), *math* (real numbers including dollars & cents), *date*, and *derived* (formulas calculated from other elements in the same record). You can store any type of data using these field types!

Display & Entry Screens

Design up to 9 different screen formats for data display and data entry for each data base. This is helpful for accessing your data for different purposes as well as in easy data entry of specific elements.

Sorts & Selections:

Up to 9 different access keys can be defined. These are used for displaying data on the screen or selecting data for printing. You may use several levels of sorts as well as logical operators to select just the right data. A powerful generic search is also available.

Reports:

See your data any way you want by designing your own reports! **Data Master** offers easy-to-use tools to design professional reports including report headings, titles, column headings, automatic page numbers, column totals, and more. Store up to 9 report formats for each data base. At print time use the powerful access keys to select the data printed on any report format.

File Management

Built-in file management capabilities allow easy file manipulation for transferring data files, renaming data files, expanding data files, and more. This integrated function is easy to use and available from the simplified pull-down menu system.

Full keyboard ease

Data Master takes full advantage of the CoCo 3's cursor and function keys.

OS-9 accessible

Even while operating within **Data Master**, you can invoke OS-9 commands.

Requires: OS-9 Level II, CoCo 3, 512K

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Color Demo

16K
ECB

All the Colors of the Rainbow

By Patrick Benway

When you run *Colorfest*, you will discover that there is not one color in nature that is not eventually generated. You may be puzzled to note that only three color statements (`PCLS`, `SCREEN` and `PSET`) are used to generate every color, shade, hint or hue possible. The longer you let this program run, the better it gets. Enjoy, and see how many different colors you can spot. The colors can be seen only on a TV or color composite monitor, however.

The listing: `COLRFEST`

```
10 REM***************************
20 REM*     COLOR MY RAINBOW      *
30 REM*           1986            *
40 REM*    PATRICK J BENWAY       *
50 REM*       R.R.2, BOX 116      *
60 REM*  MANSFIELD, MO. 65704     *
70 REM***************************
80 LET JJ=1
90 PCLS:PMODE4:SCREEN1,1
100 CLS:PLAY"01;L255;V31
110 A=165:B=RND(150):C=RND(255)
120 D=RND(60):IFB<80THENB=B+81
130 IFC<80THENC=C+170
140 IFD<90THEND=D+61:FORJ=1TO30
150 V=RND(3):A=A+V:B=B-V:C=C-V
160 D=D+V:IFC<2THENGOTO90
170 LINE(A,B)-(C,D),PSET,B:NEXTJ
180 A$="A;B;C;D;E;F;G;"
190 FORX=1TO10:PLAYA$:NEXTX
200 FORK=1TO5000:NEXTK
210 LET JJ=JJ+1:CLS
220 PRINT @ 263,"COLOR GRAPHIC #
"JJ:FORJ=1TO1000:NEXTJ:GOTO90
```

Utilities

16K
ECB

They Do it with Numbers

By Dick Purnell

Number Conversion saves programmers time at the scratch pad by quickly converting numbers from one number system to another. Four number systems are offered: decimal (ordinary numbers, base 10), hexadecimal (base 16), octal (base 8) and binary (base 2).

When you run the program, you are asked for "input." You choose the option number (from 1 to 4) of the number system you want to convert. Then you are asked for "output" — the number system you are converting to. Again, select an option number.

Next you are presented with your input and output choices and a blinking cursor awaiting an input number. For example, if you had selected decimal (Option 1) for your input and hexadecimal (Option 2) for your output, you would type a number from zero to 65,535. (The range of numbers you are allowed to enter always appears under "input.") Typing a value of 500 would give you a value of 01F4.

To repeat the process for another input number, just type it and its output will appear. When entering a hexadecimal number, you must enter all four digits; use leading zeros, if necessary.

The listing: `CONVERT`

```
10 '      PROGRAM "NUMBER"
20 '         WRITTEN BY
30 '      RICHARD F. PURNELL
40 '        COPYRIGHT (C)
```

```
50 '        5/5/87
60 CLS:O$="000000"
70 A$(1)="DECIMAL":A$(2)="HEXADE
C"
80 A$(3)="OCTAL":A$(4)="BINARY"
90 PRINTA$(1);"(1)":PRINTA$(2);"
(2)":PRINTA$(3);"  (3)":PRINTA$(
4);" (4)"
100 INPUT"INPUT ";A
110 INPUT"OUTPUT";B
120 IFA=1ANDB=4THENC$="   0-255"
130 IFA=1ANDB=2THENC$="   0-65535
"
140 IFA=1ANDB=3THENC$="   0-4095"
150 IFA=2ANDB=1THENC$="   0000-FF
FF"
160 IFA=2ANDB=3THENC$="   0000-0F
FF"
170 IFA=2ANDB=4THENC$="    0000-00
FF"
180 IFA=3ANDB=1THENC$="    0000-77
77"
190 IFA=3ANDB=2THENC$="    0000-77
77"
200 IFA=3ANDB=4THENC$="    0000-37
77"
210 CLS:PRINT"    ";A$(A),A$(B):P
RINTC$
220 PRINT@97,"";:LINEINPUT" ";Y$
:N=VAL(Y$)
230 ON A GOTO240,390,400,470
240 ON B GOTO250,270,290,350
250 PRINT@97,"          ";:PRINT@1
12,N$;:IFB=1THENPRINTN
260 GOTO220
270 N$=RIGHT$("000"+HEX$(N),4)
280 GOTO250
290 N$="":FORX=0TO3
300 S=INT(2^(9-3*X))
310 D=INT(N/S)
320 N=N-D*S
330 N$=N$+CHR$(D+48)
340 NEXT:GOTO250
350 N$="":FORX=0TO7:N$(X)="0"
360 IFN=>INT(2^(7-X))THENN$(X)="
1":N=N-INT(2^(7-X))
370 N$=N$+N$(X)
380 NEXT:GOTO250
390 T=12:U=4:GOTO410
400 T=9:U=3
410 N=0:FORX=0TO3
420 Z=ASC(RIGHT$(Y$,4-X))
430 D=Z-48
440 IFZ>60THEND=Z-55
450 N=N+D*2^(T-U*X)
460 NEXT:GOTO240
470 N=0:Y$=O$+Y$:FORX=0TO7
480 IFLEFT$(RIGHT$(Y$,8-X),1)="1
"THENN=N+2^(7-X)
490 NEXT:GOTO240
```

16K

I/O Error Free

By Bohdan Hrycaj

Call lets you do searches for a program on tape without getting frustrating I/O errors. With *Call*, you won't have to start at the beginning of a tape or program, and you won't have to type CLOAD constantly after repeated I/O errors.

Key in the listing and make several copies. Run the program, and you should see "CALL=" on the screen. Reset the computer. Now, whenever you want to load in a BASIC program, type EXEC. When the "CALL=" prompt appears, type in the program name (you won't need to use quotes) and press ENTER. Fast forward or reverse your cassette to the approximate location of the program, press play, and the program will automatically load when found.

The only time you'll get an I/O Error is when the program is not loading properly. Trying to load a machine language program causes an FM Error.

The listing: CALL

```
1 'CALL PROGRAM
2 CLEAR100,16282
3 FOR X=16282 TO 16282+97
4 READ A$
5 B=VAL("&H"+A$)
6 POKE X,B
7 NEXTX
8 EXEC 16282
9 DATA 8E,1,D1,6F,80,86,20,A7,80
,8C,1,DA,26,F9,8E,1,D2,C6,7,10
10 DATA 8E,3F,F4,A6,A0,5A,C1,0,2
7,6,AD,9F,A0,2,20,F3,5F,AD,9F,A0
11 DATA 0,27,FA,AD,9F,A0,2,81,D,
27,9,81,8,27,1B,A7,80,5C,20,E9,F
7
12 DATA 1,D1,BD,A5,86,BD,A6,81,8
1,0,26,F9,86,2,27,A,F,78,7E
13 DATA A4,A6,5A,30,1F,20,CE,7E,
A4,CD,43,41,4C,4C,3D,20,0,0
```

16K
Disk

Preventing Program Wipeout

By Mike Speer

Have you ever saved a program under the wrong name and wiped out a day's work on another program — just before making your daily backup? To prevent these catastrophes you must never make a mistake when doing the *same* thing every day (nobody's perfect). Or you can include the short routine in your programs that *Safesave* generates.

The program generates four lines that allow you to safely save your program:

```
1 GOTO 10
2 VERIFYON:SAVE"filename":STOP
3 VERIFYON:SAVE"filename:1":STOP
10 '
```

At the end of your program, add the statement `GOTO 2` or `GOTO 3` (depending on which drive you want to save to — you can change the drive number in Line 3 to another drive if you want). For instance, typing `40000 GOTO 2` would ensure that the program is saved. Run the program when you are ready to quit and it updates itself.

Running *Safesave* creates those first four lines at the beginning of a new program. If you want to use *Safesave* in another program, make sure there is room for lines 1 through 10, or put them elsewhere in the program.

The listing: `SAFESAVE`

```
1 CLS:Q$=CHR$(34):OPEN"O",1,"NEW
.DAT":PRINT#1,"1GOTO10":LINEINPU
T"ENTER PROGRAM NAME: ";N$:PRINT
#1,"2VERIFYON:SAVE";Q$;N$;Q$;":S
TOP":PRINT#1,"3VERIFYON:SAVE";Q$
;N$;":1";Q$;":STOP":
2 PRINT#1,"10'":CLOSE:MERGE"NEW.
DAT"
```

Home Help

16K
ECB

Stitch Niche-ery

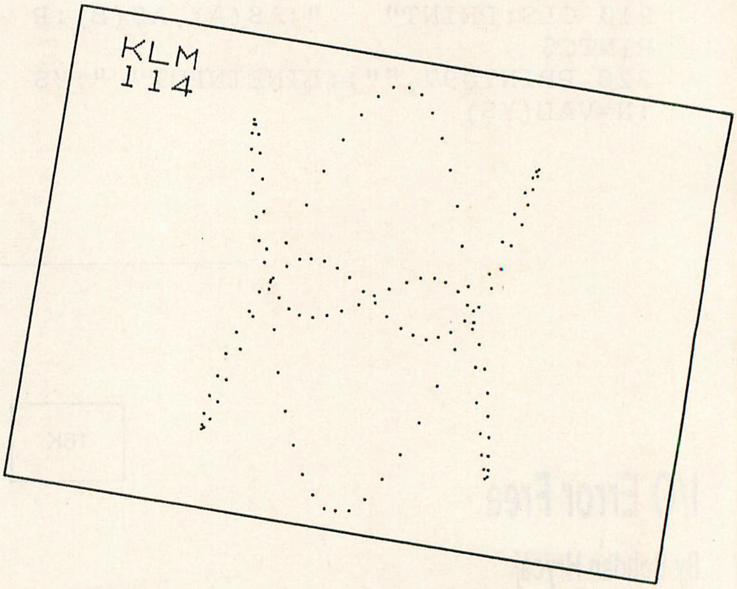
By George R. Furman

Embroidery generates symmetric patterns on your screen that can be dumped to the printer to serve as a basis for embroidery and other decorative patterns.

When the constants K, L and M on lines 130 to 150 are all equal, a circle is formed. Variations are controlled by changing the magnitudes of the radius (constant K on Line 450) and the horizontal (x) and vertical (y) coordinates influenced by L and M in lines 460 and 470. K, L and M can be increased to almost any limit beyond six; however, the resulting patterns take a long time to draw on the monitor and are too complex. Furthermore, exact multiples can become repetitious: 111, 222, 333, etc., all create a simple circle.

The multiplier constant 94 in Line 450 controls the overall size of the patterns. Reducing this makes the pattern smaller, but anything much larger won't fit on the screen. For tighter patterns (points closer together), the `STEP` value of .05 in Line 440 can be reduced to as small as .002.

The screen shows the values of K, L and M along with the specific image, making it easy to study the relationships of those factors. If you should want to return to a particular pattern, KLM=341, for example, reenter lines 130 to 150 as `130 K=3`, `140 L=4`, `150 M=1` and add `505 GOTO 505`. In some instances a half-developed pattern can be of interest — such as patterns 136 and 165. These can be gotten by changing the limit in Line 440 to one pi (3.1416) instead of two pi.



The listing: `EMBROID`

```
10 '   * * * * * * * * * * * * *
20 '   *     EMBROIDERY        *
30 '   *          BY           *
40 '   *   GEORGE R FURMAN     *
50 '   *      P.O.BOX 506      *
60 '   *  GLENHAM,N.Y.12527    *
70 '   * * * * * * * * * * * * *
80 '
90 '
100 'TAPE TITLE: "EMBROID"
110 '
120 PMODE 4,1:PCLS:SCREEN 1,1
130 FOR K= 1 TO 6
 140 FOR L= 1 TO 6
 150 FOR M= 1 TO 6
 160 K$="BM2,22;" 'LOCATES FIRST
NUMBER
```

```
170 L$="BM14,22;" 'LOCATES SECON
D NUMBER
180 M$="BM26,22;" 'LOCATES THIRD
 NUMBER
190 N$(1)="BU8BR3R1D8BL2R4"
      '1
200 N$(2)="BU7E1R6F1D2G1L6G1D3R8
U1"    '2
210 N$(3)="BU6U2R8G3L1BR1F2D2G1L
6H1U1" '3
220 N$(4)="BR6U8G6R8"
      '4
230 N$(5)="BU2F2R4E2U2H2L6U2R8"
      '5
240 N$(6)="BU4R6F1D2G1L4H2U4E2R4
F1"    '6
250 IF K=1 THEN DRAW K$+N$(1)
260 IF K=2 THEN DRAW K$+N$(2)
270 IF K=3 THEN DRAW K$+N$(3)
280 IF K=4 THEN DRAW K$+N$(4)
290 IF K=5 THEN DRAW K$+N$(5)
300 IF K=6 THEN DRAW K$+N$(6)
310 IF L=1 THEN DRAW L$+N$(1)
320 IF L=2 THEN DRAW L$+N$(2)
330 IF L=3 THEN DRAW L$+N$(3)
340 IF L=4 THEN DRAW L$+N$(4)
350 IF L=5 THEN DRAW L$+N$(5)
360 IF L=6 THEN DRAW L$+N$(6)
370 IF M=1 THEN DRAW M$+N$(1)
380 IF M=2 THEN DRAW M$+N$(2)
390 IF M=3 THEN DRAW M$+N$(3)
400 IF M=4 THEN DRAW M$+N$(4)
410 IF M=5 THEN DRAW M$+N$(5)
420 IF M=6 THEN DRAW M$+N$(6)
430 DRAW"BM2,10;U8BR8G4L4BR4F4BR
4U8BD8R8BR4U8F4E4D8" 'DRAWS K,L
AMD M
440 FOR Q= 0 TO 6.28318 STEP.05
'USE STEP .002 FOR CLOSE LINE
450 R=94*COS(K*Q)
460 X=1.35*R*SIN(L*Q)
470 Y=R*COS(M*Q)
480 IF X>126 OR X<-128 GOTO 500
490 PSET(128+X,96+Y)
500 NEXT Q
510 FOR T= 1 TO 2000:NEXT T
520 PCLS
530 NEXT M:NEXT L:NEXT K
540 GOTO 120
550 END
```

CoCo Concoctions

4K

By David Allen

Type in and run *Apple Pie* while your printer is online, and you'll have a recipe printing out that will make your mouth water. This program is designed for an Epson compatible printer. You will have to alter the control codes in lines 450 through 480 for your particular printer.

The listing: APPLEPIE

```
10 ' APPLEPIE  04/02/85
20 REM: ONE-CRUST APPLE PIE
30 L1$ = "DOROTHY ALLEN"
40 L2$ = "P.O. BOX 531"
50 L3$ = "BREWSTER, WA. 98812"
60 L4$ = "PHONE: 689-2831"
70 GOSUB 440
80 PRINT #-2,TAB(16);"APPLE  PIE
"
90 PRINT#-2:PRINT#-2
100 PRINT#-2,TAB(14);"ONE  CRUST
 PIE"
110 PRINT#-2:PRINT#-2
120 PRINT#-2,"      PASTRY      FI
LLING    TOPPING    "
130 GOSUB 480
140 PRINT#-2:PRINT#-2
150 PRINT#-2,TAB(9);"MIX AND ADD
";TAB(32);"MIX TOGETHER";
160 PRINT#-2,TAB(55);"BAKE AT 37
5"
170 PRINT#-2,TAB(9);"TOGETHER ";
TAB(32);"AND TOSS WITH";
180 PRINT#-2,TAB(55);"1 HOUR"
190 PRINT#-2,TAB(36);"APPLES"
200 PRINT#-2:PRINT#-2
210 PRINT#-2,TAB(9);"1 CUP FLOUR
";TAB(32);"1/2 CUP SUGAR";
220 PRINT#-2,TAB(55);"1/2 CUP SU
GAR"
230 PRINT#-2,TAB(9);"1 CUBE MARG
ARINE";TAB(32);"2  TBSP FLOUR";
240 PRINT#-2,TAB(55);"1/2 CUP FL
OUR"
250 PRINT#-2,TAB(9);"1/4 CUP MIL
K";TAB(32);"1/2 TSP CINNAMON";
260 PRINT#-2,TAB(55);"1/3 CUP MA
RGARINE"
270 PRINT#-2,TAB(32);"1/8 TSP NU
TMEG"
280 PRINT#-2,TAB(32);"    DASH O
F SALT"
290 PRINT#-2,TAB(32);"4 LARGE GO
LDEN APPLES"
300 PRINT#-2:PRINT#-2
310 PRINT#-2,TAB(17);"PREPARE PA
STRY AND TURN INTO 9 INCH PIE PL
ATE"
320 PRINT#-2,TAB(25);"POUR IN TH
E APPLE PIE FILLING"
330 PRINT#-2,TAB(27);"SPRINKLE W
ITH THE TOPPING"
340 PRINT#-2:PRINT#-2
350 PRINT#-2,TAB(30);"FROM THE K
```

```
ITCHEN OF"
360 GOSUB 440
370 PRINT#-2,TAB(13);L1$
380 PRINT#-2,TAB(13);L2$
390 PRINT#-2,TAB(13);L3$
400 PRINT#-2,TAB(13);L4$
410 GOSUB 480
420 END
430 REM: DEFINE MACRO FOR EMPHAS
IZED AND EXPANDED TEXT
440 PRINT#-2:ESC$=CHR$(27)
450 PRINT#-2,ESC$;CHR$(43);ESC$;
"E";ESC$;"W";CHR$(1);CHR$(30)
460 PRINT#-2,ESC$;CHR$(33):RETUR
N
470 REM: REINITIALIZES PRINTER T
O NORMAL PRINTING
480 PRINT#-2,CHR$(27);"@":RETURN
```

CoCo 3

16K
ECB

Who'll Win on the Gridiron?

By Jeff Remick

Football Winner helps you try to pick the winning team in any football game. When you run the program, you will be asked for the names of the two teams playing (remember to put the home team first). The computer then asks you questions about the teams — you may need to refer to the sports page of your newspaper for help. When all the questions have been answered, the computer will predict a winner.

The listing: FOOTBALL

```
1 ' *****************************
2 ' **                         **
3 ' **    FOOTBALL WINNERS     **
4 ' **           BY            **
5 ' **      JEFF REMICK        **
6 ' **                         **
7 ' *****************************
10 POKE65495,0:CLS:PRINT@104,"Fo
otball Winners"
20 PRINT@175,"by":PRINT@234,"Jef
f Remick":PRINT@355,"press any k
ey to continue":POKE65314,80:EXE
C 44539
30 CLS
40 PRINT"TEAM NAMES.HOME TEAM FI
RST":INPUT A$,B$
50 CLS:W=0:L=0:T=0:WH=0:LH=0:PA=
0:PF=0:WA=0:LA=0
60 PRINT@10,A$
70 PRINT:INPUT "WINS";W
80 INPUT "LOSSES";L
90 INPUT "TIES";T
100 INPUT "WINS AT HOME";WH
110 INPUT "LOSSES AT HOME";LH
120 INPUT "POINTS FOR";PF
130 INPUT"POINTS AGAINST";PA
140 GOSUB360 :GOSUB400
150 A=A+W*2-L-(T/2)+(WH/2)-(LH/2
)+FP-AP+.5
160 CLS:W=0:L=0:T=0:WH=0:LH=0:PF
=0:PA=0
170 PRINT@10,B$
180 PRINT:INPUT"WINS";W
190 INPUT"LOSSES";L
200 INPUT "TIES";T
210 INPUT "WINS AWAY";WA
220 INPUT "LOSES AWAY";LA
230 INPUT "POINTS FOR";PF
240 INPUT "POINTS AGAINST";PA
250 GOSUB360:GOSUB400
260 B=B+W*2-L-(T/2)+(WA/2)-(LA/2
)+FP-AP
270 CLS
280 PRINT@8,"FOOTBALL WINNERS"
290 PRINT STRING$(32,"-")
300 PRINT:PRINT@72,"MOST POINTS
WINS":PRINT:PRINT
310 PRINT"HOME-----";A$"-";A
320 PRINT"VISITORS-";B$;"-";B
330 PRINT:PRINT:PRINT
340 POKE65494,0:PRINT@330,"AGAIN
(Y/N)";:INPUT A$
350 IF A$="Y" THEN 30 ELSE END
360 FOR Q=0 TO 3000 STEP 100
370 IF PF>Q THEN NEXT Q
380 FP=Q/100/2-.5
390 RETURN
400 FOR Q=0 TO 3000 STEP 100
410 IF PA>Q THEN NEXT Q
420 AP=Q/100/2-.5
430 RETURN
```

Contributions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

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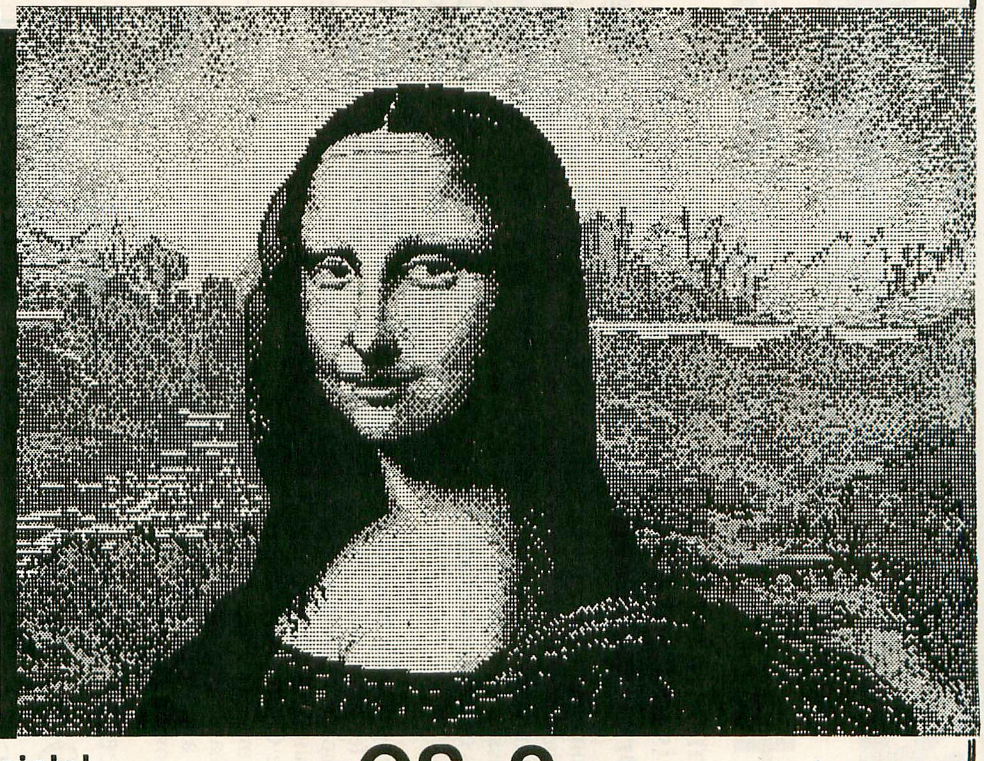

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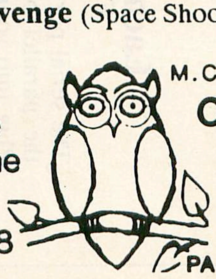

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OS-9

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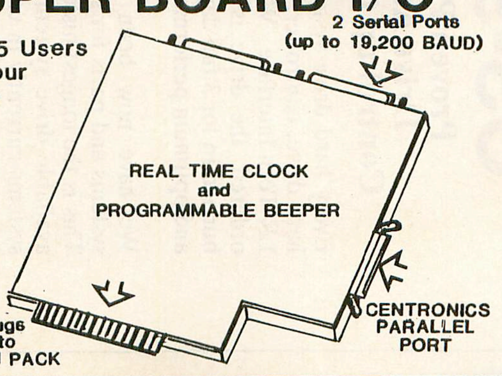

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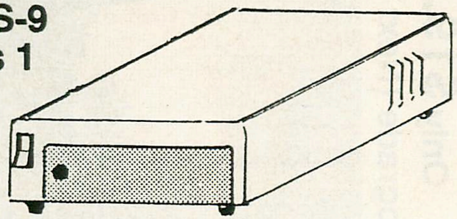

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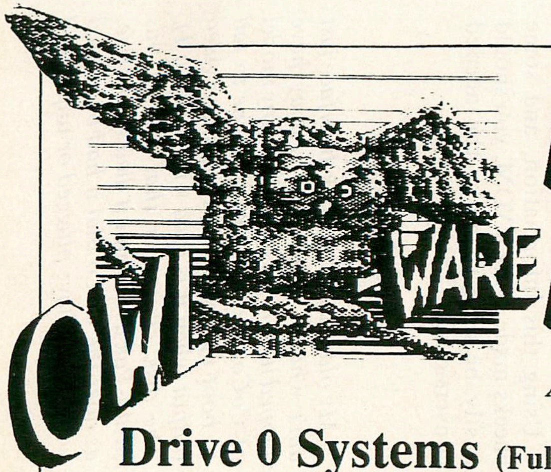

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The Death of a Keyboard

By Marty Goodman
Rainbow Contributing Editor

I left my CoCo 1 on for 24 hours, and when I came back to it only the CONTROL-C (CLEAR-C) *key sequence was working. I turned the CoCo off then turned it on again, but the keyboard seemed completely dead. How can I fix it?*

John W. Wooster
(JW47)
Jackson, MI

The most common cause of a suddenly, completely *dead* keyboard is a joystick button being somehow depressed. So, first unplug your joysticks and see if the problem goes away. Then make sure that the contacts for the joystick buttons on the joystick connector are not somehow shorted to ground.

If this is not the case, then you must determine whether the CoCo motherboard is at fault, or whether the fault lies in the keyboard. This can be done by swapping a keyboard with another CoCo 1 and trying out *your* keyboard in the other CoCo 1. If you don't have access to another CoCo 1, you can accomplish the same thing (albeit a bit more tediously) by using a VOM as a continuity checker along with the schematic diagram of the keyboard matrix to make sure that all the keys cause the appropriate shorts between row and column contacts on the keyboard cable (this tests the keyboard), and then by shorting with a jumper wire appropriate pins on the CoCo motherboard connector (referring to the keyboard matrix schematic again) and seeing if the right characters are generated on the screen.

In your case, if the problem is not a joystick problem, and if you confirm the keyboard is still visibly plugged into the CoCo motherboard, it sounds like you may have a dead keyboard PIA chip inside the CoCo. On the older CoCo 1s, this is a 6821 chip, and on the late model (F or NC board CoCo 1s) this would be a 6822 chip. Either chip is readily and inexpensively available from Tandy National Parts. You may be able to check this first by swapping the 6821 or 6822 chip with another CoCo 1. Be sure you get the *right* chip by referring to the schematic diagram of your particular model CoCo or merely by tracing the connections from the CoCo motherboard keyboard connector to the PIA chip they go to.

CoCo-IBM Joystick Swap

Can a CoCo 3 two-button joystick be used on the IBM PC XT or clones? How about using an IBM PC XT type joystick on a CoCo 3?

John Bennett
(JOHNGB)
Shelby Township, MI

The joysticks used by the CoCo 3 and by the IBM PC XT are pretty much electrically identical. The difference between them is merely in the connector used. So, yes, both conversions are possible, provided you are dealing with a two-button joystick. The CoCo 3 manual gives you the pinout of the joystick port. All you need to know is the pinout of the IBM PC's joystick port, and then you (or any competent hacker) can make the needed conversion given the proper connectors, which are available at Radio Shack stores.

The pinout of the IBM PC type joystick is as follows:

PIN	Function
1	+5 VDC
2	button 4
3	position 0 (wiper of the potentiometer)
4	ground
5	NC
6	position 1
7	button 3
8	+5 VDC
9	+5 VDC
10	button 6
11	position 2
12	ground
13	position 3
14	button 7
15	ground

Using this information, and some checks made using a VOM, you should easily be able to make the needed conversions.

Zapped Multi-Pak

My old gray Multi-Pak Interface just ain't what it used to be. I may have zapped it. When I plug it into any model of CoCo, it causes the machine to fail to boot up (although I get some video output when it is used with a CoCo 1). The disk controller that was in this Multi-Pak at the time it died works fine, as does the CoCo that it had been used with. I may have plugged or unplugged

---

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's *CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.*

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	Barbarossa, Luftflotte, Battle Hymn (256K) available Tandy 1000	
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D — Disk only (no D means program available tape or disk)
HR — High Resolution SG — Semigraphics ML — Machine Language
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the pack into or out of the CoCo with the power on. Can you tell me how to fix it?

Mike Andrews
(MANDREWS)
Gary, IN

It sure sounds like your Multi-Pak Interface has gotten "zapped." One of the common causes of this is a blown 74LS367 chip. The MPI uses several of these to buffer the CoCo's address and other lines. Try checking continuity between every input on all the LS367 chips and ground using a VOM. If you find any that are nearly zero ohms from ground, then you have located a blown chip, and must remove and replace it. A better approach might be to hook up an oscilloscope to all of the address lines, one at a time, while the MPI is in use. You may be able to identify one that is tied low or high. If so, this is connected to a bad LS367 chip. I have fixed two blown MPIs in this fashion. The 74LS245 that buffers the data lines could also be the culprit. Note that all models of MPI use these chips, so this advice is good for *any* blown MPI. Check also for shorts between the NMI or the HALT line and ground inside the MPI. It is rare (though always possible) for the PAL chip in the MPI to be the cause of the problem here.

Why You Avoid Y

I find I am unable to boot OS-9 using a Korean CoCo and a Y cable between the CoCo and the disk controller. Yet I can boot using the same setup and an older model CoCo. Why is this?

Mark E. Schweder
(MSCHWEDER)
Gainesville, FL

You should not use a Y cable at all. Period. Instead, it is essential, if you want to use more than one card in the CoCo system bus, that you buy a Multi-Pak Interface. The reason is that the Y cable causes the very fragile, unbuffered CoCo system bus to be stressed to the limit by its added capacitance and other properties. In some cases this causes a marginal system that works *most* of the time, and in others it causes a system that is unable to do Disk I/O. How bad an effect the Y cable has is probably determined by what batch of chips was used in the CoCo, and other very minor details of differences in design between various models of the CoCo. Note, also, that OS-9 puts a particular strain on the disk I/O hardware, and if a problem is to occur, it is most likely to show up under OS-9.

For those who insist on ignoring the advice, your system may *appear* to work correctly, but you have removed all margin of safety from the disk I/O hardware, and risk a massive crash at any moment. The longer the Y cable, the more likely it is to cause trouble. I must confess that in some experiments I have found that Y cables that have no more than a total of an inch of ribbon cable seem to be the most reliable. But I do not recommend even these.

Lowercase on CoCo 2

How can I take advantage of the lowercase display capability built into the late-model Korean CoCo 2s? Can I replace the character set in the CoCo 32-column display with characters of my own design?

Alexander L. Schultz
(EXLAX)
Marysville, KS

I've consulted with my friend Art Flexser of SpectroSystems, for he is the master of CoCo 2 lowercase in these parts. The easiest way to make use of the 32-column lowercase capabilities present in the 'B' model Korean CoCos would be to buy ADOS Version 1.02. (If you own a previous version of ADOS, you can upgrade to Version 1.02 for $10.) Look for the SpectroSystems ad in this issue of RAINBOW.

If you can put your CoCo into 64K mode, the following pokes will make the needed lowercase mods under BASIC: `POKE &H95C9,&H57:POKE &HFF22,&H50` will produce a green border; `POKE &H95C9,&H17:POKE &HFF22,&H10` will produce a black border; `POKE &H95C9,&H37:POKE &HFF22,&H30` will give you an inverse screen. All will give you true lowercase.

Note that you'll have to re-poke `&HFF22` whenever you use `PMODE 3` or 1. If you get ADOS 1.02, you will *not* need to re-poke `&HFF22` in such cases.

Some folks have published the suggestion that one try `POKE 359,57:POKE &HFF22,&H50`, which can be done without using the 64K mode. That approach is to be *avoided*! It disables the return to the text screen upon breaking out of a program that was in graphics mode. Much worse, the `POKE 359,57` disables ASCII saves to tape or to disk, with *no* indication that any failure ever occurred until you try to read your saved file, which will be totally blank.

Note that a 'B' model Korean CoCo 2 is required for all this. These are the CoCo 2s that have a 'B' suffix after their catalog number on the machine (e.g., 26-2027B, 26-3134B and 26-3136B).

As for modifying the character set used by the CoCo 2, it is possible but cannot be done without significant hardware hacking. In the early days of the CoCo, several manufacturers produced "lowerkits" that would do exactly what you wanted, provided you could burn your own 2716 EPROM. You see, the VDG chip does have provisions for getting its character set from an external character generator ROM. But the CoCo did not implement this option, and a special board with extra circuitry had to be added. With the advent of the CoCo 2B with built-in lowercase and later the CoCo 3 with full 80-column lowercase, the market for lowerkits ended, and none have been offered for sale for quite a while.

Booting *Micro Illustrator*

My copy of Micro Illustrator *will not boot properly on my CoCo 3. How can this be fixed?*

Greg Kazian
Greer, SC

The problem is caused by the fact that *Micro Illustrator* contains its own mini OS-9 Level 1 Version 1.0 or 1.01. Neither of these early versions of OS-9 can boot properly on the CoCo 3 because they overwrite the interrupt vectors of the CoCo 3 that live at $FEE0 through $FEFF. You can get around this problem by first booting up OS-9 Level 1 Version 2.00, then putting the *Micro Illustrator* disk in Drive 0 and pressing reset. This will cause a reboot under OS-9 Level I Version 2.0, and *Micro Illustrator* will start working. This same trick will fix the same problem that you will encounter on the CoCo 3 with *DL LOGO*, *Trivia Fever*, and one or two other older CoCo OS-9 products.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

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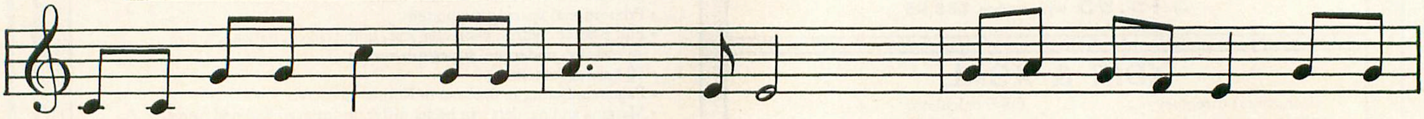
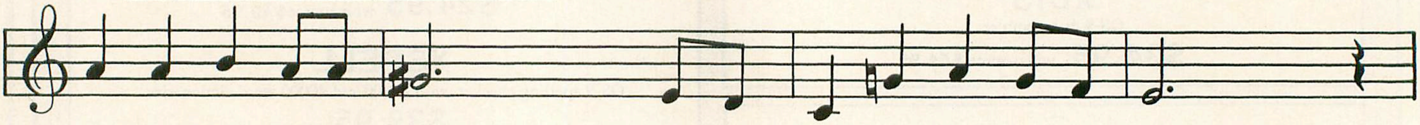
Do You Hear What I Hear?



By John Mosley



Your ears do not deceive — it's CoCo singing in four voices

The holiday season is a time for singing, so let your CoCo join the chorus of carolers with *Do You Hear What I Hear*, a four-voice music and graphics program.

Do You Hear What I Hear is actually two programs — a BASIC driver (to create graphics, play and load music) and a machine language editor.

Each memory location in the CoCo from 0 to 65,535 holds one value between 0 and 255 or between &H00 and &HFF. The values in `ML SONG`, Listing 3, are in hexadecimal. I chose this format because it involves less typing.

Start off by typing in Listing 1; save it on the cassette you are using. Then type in Listing 2 and save it on another tape, or on the reverse side of your tape, leaving about a 30 second gap between listings 1 and 2. Run Listing 2. You will not load an old file if you are just starting to enter Listing 3. When prompted for the start address, enter a value of 16128.

Enter Listing 3 one hexadecimal value at a time. All of the hexadecimal values are separated by two spaces. When you are through entering Listing 3, or when you have to stop entering, type `S` and press ENTER. If you are just stopping temporarily and plan to resume entering later, write down the number to the left of the 'S' you typed *before* you press ENTER. The number should be five digits long.

When you are ready to resume entering, use that number as your start address. You will have to load the old file you saved before you can resume entering Listing 3.

When you have finished and everything is saved properly, all you have to do is load and run `XMASSONG`, leave the play button down, and follow the prompts.

As listed, `XMASSONG` will work with a disk drive. `MLEDITOR`, however, is set up for tape users. To use `MLEDITOR` on a disk system, change `CLOADM` to `LOADM` in Line 4. Also, change `CSAVEM` to `SAVEM`

John Mosley is a freshman at Portland High School, in Portland, Conn. He enjoys working with the Color Computer, and especially likes sound and graphics.

in Line 10 and change "cassette" to "disk" in Line 11. Now, when you enter Listing 3 into the editor, the resulting machine language file will be saved to disk instead of tape.

For those who get RAINBOW ON TAPE and want to transfer `ML SONG` to disk, the start, end and transfer addresses are $3F00, $4F24 and $3F00, respectively. Simply `CLOAD` the file from tape and type `SAVEM"ML SONG",&H3F00,&H4F24,&H3F00` followed by ENTER.

(Questions about this program may be directed to the author at 420 Main Street, Portland, CT 06480. Please enclose an SASE when writing for a reply.) ☐

Editor's Note: The song file, `ML SONG`*, will replace Listing 3 on this month's RAINBOW ON TAPE and RAINBOW ON DISK.*

130 3
180 164
240 222
300 224
END 67

Listing 1: `XMASSONG`

```
10 DIMC$(80):CLEAR120,&H3EFF:CLE
AR1000
20 PMODE4,1:PCLS0:SCREEN1,1:FORT
=0TO60STEP2:LINE(T,0)-(T,60),PSE
T:NEXTT
30 FORT=1TO1000:NEXTT:CLS:PRINT"
IF BOX IS BLUE THEN PRESS <C>
TO CONTINUE, ELSE RESET AND RUN"
:GOSUB 370:PCLS0
40 CLS 4:PRINT@131,"DO YOU HEAR
WHAT I HEAR";:PRINT@330,"BY: JOH
N H. MOSLEY";:FORT=1TO2000:NEXTT
50 '***DO YOU HEAR WHAT I HEAR**
*
60 PRINT@449,"PREPARE (C)ASSETTE
 OR (D)ISK:";
70 A$=INKEY$:IFA$=""THEN70
80 IF A$="C"THEN100 ELSE IF A$="
D"THEN90
90 LOADM"ML SONG":GOTO110
100 CLOADM"ML SONG"
110 LINE(5,4)-(251,187),PSET,B:P
OKE178,2:PAINT(0,0),,1
120 CLEAR1000:C$="C1URUE2RERER5F
RF3DFD36L4U38D3HU2L5GLG3LH2F2U3F
R2EU4ERD4R2U4R2FRD2R2D2GE2DFD2G4
E2D5GE3D5G3ED5GE2RD4G3ED5GE3D5G3
R"
130 FORD=1TO68:READA,B:PSET(A,B,
1):NEXTD
140 DATA 88,8,88,14,94,8,94,14,1
61,10,162,11,166,11,167,10,161,1
6,162,15,166,15,167,16,163,41,16
3,47,169,41,169,47,18,83,18,87,2
2,83,22,87,89,77,94,74
150 DATA 215,12,215,14,213,15,21
7,15,215,16,213,17,217,17,211,18
,215,18,219,18,213,19,217,19,211
,20,215,20,219,20,209,21,213,21,
217,21,221,21,211,22,215,22,219,
22
160 DATA 209,23,213,23,217,23,22
1,23,211,24,215,24,219,24,209,25
,213,25,217,25,221,25,211,26,215
,26,219,26,209,27,213,27,217,27,
221,27,211,28,215,28,219,28,213,
29,217,29,215,30
170 FOR A=19 TO 219 STEP 40:DRAW
"BM=A;,130;"+C$:PAINT(A+4,129),1
,1:PAINT(A+12,126),1,1:PAINT(A+1
6,132),1,1:PAINT(A+16,142),1,1:P
AINT(A+16,152),1,1:PAINT(A+16,16
2),1,1:NEXT A
180 DRAW"C1BM42,18;NU3NR3ND3NL3N
E2NF2NG2NH2":DRAW"BM91,11;NU3NR3
ND3NL3":DRAW"BM164,13;NU4NR4NL4N
D4":DRAW"BM166,44;NU4NR4ND4NL4NE
NFNGNH":DRAW"BM194,95;NU4ND4NR3N
L3NENFNGNH":DRAW"BM89,74;F2D2BR3
BU1H2U2BU2RFRF2D3G2LGL3HLH2U3E2R
ER3"
185 DRAW"BM20,85NU3NR3ND3L3"
190 DRAW"C1BM6,49;ERE5UEUEUEU3EU
8EU2D2FD3FD2FD2FDFDFDFEUEUEU2EUE
U2EU4RU2D2RD8FD4FDFDFDFDF4RDRL5H
3UHUHUHUHUHU3D3LDG2DGDGL2HUHUH2U
LU3D3GDGDGDGDGDG2LGL4":PAINT(18,
30),1,1
200 DRAW"C1BM233,44;DG2LH2U2E3R2
F2D4G3L30H2F2R9U17FRD16U16R2D16U
16R2D16U16E2D18U4REU2H":DRAW"BM2
10,35;GD2R"
210 C$="C1R3FR2FR7FR2F3D6GDG2D3F
D3FD2F3RL5H2U2HU3HU2H2L5DGD4GD4G
DL4EUEU4EU4EU5HU4HU3H2F2BR3BD2FR
6FR3FD5GL9U5HU2":DRAW"BM77,21;"+
C$:DRAW"BM105,21;"+C$:PAINT(90,2
5),1,1:PAINT(120,25),1,1
220 DRAW"C1BM49,49EUEU3EU4EU4HU3
HUHUHERE2R2ER3FR2FRFER3FRLGL2GL3
HL2HL3GLGFDFD2FER2FR2FR2L2G2LHL2
GD3GD4GDR2FR3FR2FRFER3FRLGL2GL3H
L3HL3HL3GLG":PAINT(53,24),1,1:PS
ET(51,47,1)
230 DRAW"C1BM130,21;R4F6DFDFDFD2
RU2EUEUEUE6R4G3LG3DGDGDGDGD2GD10
F2RL9RE2U9HU2HUHUHUHUH3LH3":PAIN
T(140,30),1,1
240 C$="C1FD2L2U2D2GLG3DGD2FDF3R
FR2ERE3UEU2HUH3LHL2D13U13GLD11U1
1G2D7U7E2RER2D13U13FRD11U11F2D7U
2LU3L2U2D2RD3LD2":FORA=33TO233ST
EP40:DRAW"BM=A;,168;"+C$:NEXTA
250 DRAW"C1BM31,76;U3H3LHL2HL10G
```

```
LG2DGDGD30FDF3R12ER2ERE3U3G4L3GL
11H2U29EU2E2R11FR2F4":PAINT(20,7
0),1,1
260 DRAW"C1BM35,68;R4FD5FD3FD8FE
2R8FRF3DFD2FD10FDF3L3H3UHU10HU2H
2LHL5G3DGD7GD4GD2GL5RE2U3EU6EU8H
U9HU3HU4H2":PAINT(40,80),1,1
270 DRAW"BM64,86;R4F2ERE2R6FRF3G
2H2LHL4G3DGD5FD7GD3L4EU4EU4HU6HU
3H3":PAINT(70,90),1,1
280 DRAW"BM88,85;R7G2D21F2L7E2U2
1H2":PAINT(91,91),1,1
290 C$="G2H3L8G2D3FRFR6FRFRF3DFD
4GDG3LGLGL5HLH3E2F3R5ERE3U3HUH2L
HL5HL2HLH2U4EUE2RER8FRF3":DRAW"B
M116,86;"+C$:DRAW"BM226,86;"+C$:
PAINT(110,94),1,1:PAINT(220,94),
1,1
300 DRAW"BM125,68;R7G2D13R6E2D7H
2L6D21F2L7E2U21L6G2U7F2R6U13H2":
PAINT(128,80),1,1
310 DRAW"C1BM141,84;R4FDFRE2RER3
FRF2D17FEU17E2RER3FRF4DFD11FD3F4
L3HLH2U4HU11H4L2GLGD16G3H3U16HLH
L2G4D5FD6GD2GDG2L3E3U4EU5HU7HUH3
":PAINT(145,85),1,1
320 DRAW"BM204,110;L3U2GLGL8HLH2
UH2UHU12EUEUE3R12F3DFD22":DRAW"B
M189,86;R9F3D15GLG2L6H4UHU10EU2E
2":PAINT(190,85),1,1
330 FORT=1TO29:READA,B:PRESET(A,
B):NEXTT:DATA130,69,128,70,129,7
2,128,74,129,76,128,78,129,80,12
8,82,128,86,129,88,128,90,129,92
,128,94,129,96,128,98,129,100,12
8,102,129,104,128,106,129,108,12
8,84,126,85,124,84,122,85,120,84
,130,85,132,84
335 DATA134,85,136,84
340 PMODE4,1:SCREEN1,1:GOSUB390
350 EXEC&H3F00
360 FORT=1TO3000:NEXTT:GOTO350
370 IFINKEY$=""THEN 370
380 RETURN
390 FORT=1TO600:NEXTT
400 RETURN
```

Listing 2: MLEDITOR

```
0 CLS:CLEAR1000:CLEAR200,&H3EFF
1 PRINT" *** EDITOR ***"
2 FORT=1TO1000:NEXTT
3 INPUT"LOAD OLD FILE(Y/N):";C$
4 IFC$="Y" THEN GOSUB11:CLOADM"M
L SONG":GOSUB14:ELSE 5
5 CLS:INPUT"START ADDRESS:";A
6 FORX=A TO &H4F24:PRINTX;:INPUT
":&H";A$
7 IF A$="S" THEN 10
8 POKEX,VAL(HEX$(A$))
9 NEXTX
10 GOSUB11:CSAVEM"ML SONG",&H3F0
0,&H4F24,1:END
11 PRINT"READY CASSETTE(PRESS AN
Y KEY)"
12 IF INKEY$=""THEN12
13 RETURN
14 INPUT"MAKE PRINTOUT";C$:IFC$=
"Y" THEN 15 ELSE RETURN
15 FORT=&H3F00 TO &H4F24 STEP12:
FOR TT=0 TO 11:PRINT#-2,HEX$(PEE
K(T+TT));"  ";:NEXTTT:PRINT#-2:N
EXTT
```

Listing 3: ML SONG

```
20  2   20  E   8E  40  0   EC  84  44  54  ED
81  8C  43  FE  2F  F5  86  3F  1F  8B  B6  FF
1   84  F7  B7  FF  1   B6  FF  3   84  F7  B7
FF  3   86  3C  B7  FF  23  34  1   1A  50  8E
44  0   A6  80  B7  3F  CD  EC  81  97  C0  D7
C3  EC  81  97  C6  D7  C9  20  16  81  FE  26
10  EC  84  97  C0  D7  C3  EC  2   97  C6  D7
C9  A6  4   97  CD  30  8   A6  80  2B  E6  27
4C  97  CC  D6  CD  D7  CE  A6  9F  3F  C0  AB
9F  3F  C3  A9  9F  3F  C6  A9  9F  3F  C9  B7
FF  20  DC  C1  E3  84  DD  C1  DC  C4  E3  2
DD  C4  DC  C7  E3  4   DD  C7  DC  CA  E3  6
DD  CA  A   CE  26  A   A   CC  27  BF  D6  CD
D7  CE  20  C7  30  84  30  84  B6  0   0   8A
0   81  0   20  BA  4F  1F  8B  8E  40  0   EC
84  48  58  ED  81  8C  43  FE  2F  F5  35  81
43  9E  FF  42  FB  0   40  DF  0   40  47  FF
0   60  0   FF  0   0   FF  FF  0   0   FF  FF
0   0   FF  FF  0   0   FF  FF  0   0   FF  FF
0   0   FF  FF  0   0   FF  FF  0   0   FF  FF
0   0   FF  FF  0   0   FF  FF  0   0   FF  FF
0   0   FF  FF  42  48  4E  54  5A  5E  64  68
6C  70  72  74  76  78  78  78  78  76  74  74
70  6E  6C  6A  66  64  60  5C  5A  58  54  52
50  4C  4A  4A  48  46  44  44  42  40  40  3E
3E  3E  3C  3C  3C  3C  3C  3C  3C  3C  3C  3E
3E  3E  3E  3E  40  40  40  42  42  42  42  42
42  42  40  40  40  40  40  3E  3E  3E  3C  3C
3A  3A  3A  3A  3A  3A  3A  3A  3C  3C  3C  3E
3E  40  42  42  44  46  48  48  4A  4A  4A  4A
4A  4A  4A  4A  4A  4A  48  48  46  46  44  44
44  44  42  42  42  40  40  40  40  40  42  42
42  42  42  42  42  42  42  42  42  40  40  40
40  3E  3E  3C  3C  3A  3A  3A  3A  38  38  38
38  38  38  3A  3A  3C  3C  3E  3E  40  42  42
44  46  46  48  48  4A  4A  4A  4A  4A  48  4A
48  48  46  46  46  44  44  44  42  42  42  42
40  40  42  42  42  42  42  42  44  44  44  44
46  46  46  46  46  46  48  48  46  46  46  46
46  44  44  42  42  40  3E  3C  3A  3A  38  36
34  30  2E  2A  28  24  22  20  1C  18  16  14
12  10  E   C   C   C   C   C   E   10  12  14
18  1C  22  26  2A  32  38  3C  42  44  46  4A
4C  4E  52  54  58  5A  5C  5E  62  64  66  68
6A  6C  6E  70  70  72  72  74  76  76  76  78
78  78  78  78  78  78  78  78  76  76  74  74
72  72  70  70  70  6E  6C  6C  6A  68  66  64
```

```
62  62  60  5E  5C  5C  5A  58  56  56  54  52
52  50  4E  4E  4C  4C  4A  4A  4A  4A  48  48
48  46  46  46  46  44  46  44  46  44  44  44
44  44  44  44  44  46  46  46  46  46  46  46
46  46  46  46  46  46  46  46  46  46  46  46
46  46  46  46  46  46  44  44  44  44  44  44
42  42  42  42  40  40  40  3E  3E  3E  3E  3E
3E  3C  3C  3C  3C  3C  3C  3C  3A  3A  3C  3A
3A  3C  3C  3A  3C  3A  3A  3C  3C  3C  3C  3C
3C  3C  3C  3C  3C  3C  3E  3E  3C  3E  3E  3C
3E  3C  3C  3C  3C  3C  3C  3A  3A  3A  3A  38
38  38  36  36  34  34  32  32  30  30  2E  2C
2A  28  28  26  24  24  22  20  1E  1E  1C  1A
18  18  16  14  14  12  12  10  10  E  C  C
C  C  C  A  A  A  A  A  A  C  C  C
E  E  10  12  12  14  14  18  18  1A  1E  20
22  24  26  28  2C  2E  32  34  38  3A  3E  40
44  46  4A  50  56  5A  5E  60  64  66  68  6A
6A  6A  6A  68  66  64  62  60  5E  5C  5A  56
54  52  50  50  4E  4C  4C  4E  4E  50  50  52
54  58  5A  5C  5E  60  62  64  66  66  68  6A
6A  6C  6C  68  68  68  66  64  62  62  60  5E
5C  5A  5A  58  56  56  56  56  56  56  56  58
58  58  5A  5A  5A  5A  5C  5C  5C  5C  5C  5A
5A  5A  58  56  56  54  50  4E  4C  4A  48  44
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3E  40  40  42  44  44  46  46  48  4A  48  48
48  48  48  48  46  44  44  42  40  3E  3E  3C
3C  3A  3A  38  3A  38  38  3A  3A  3A  3C  3C
3E  3E  40  40  44  44  44  44  46  46  46  44
44  44  42  40  3E  3C  3A  38  36  32  30  2E
2C  2A  2A  26  26  24  24  24  24  24  26  26
26  28  28  28  2A  2A  2A  2C  2C  2C  2C  2C
2A  2A  28  26  26  24  22  20  1E  1C  1C  1A
1A  18  18  18  18  18  1A  1A  1C  1E  20  22
24  26  2A  2A  2C  30  30  32  34  34  36  36
34  32  30  30  2E  2A  2A  26  24  22  20  1E
```

```
1A  1A  1A  1A  1A  1A  1A  1C  20  24  24  2A
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64  66  68  6A  6C  6C  6A  68  66  64  60  5E
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44  46  48  48  4A  4A  4A  4A  4A  4A  48  48
46  46  44  44  42  40  40  3E  3E  3C  3C  3C
3C  3C  3C  3C  3E  3E  3E  40  40  40  42  42
42  44  44  44  44  42  42  40  40  40  3E  3C
3A  3A  38  38  36  36  36  34  34  34  34  34
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3E  40  40  40  40  40  40  40  3E  3E  3C  3C
3A  3A  3A  38  38  38  36  36  36  36  38  38
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44  44  44  44  42  42  42  40  40  3E  3E  3C
3A  3A  38  38  36  36  34  34  34  34  34  34
34  34  36  36  36  38  38  38  3A  3A  3A  3A
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32  34  36  36  38  3A  3A  3C  3E  3E  3E  3E
3E  3C  3A  3A  36  34  30  2E  2A  26  24  20
1C  18  14  12  10  E  C  C  C  E  E  10
14  16  1A  20  24  2A  30  36  60  43  42  40
40  FE  43  42  40  40  60  0  0  0  10  A
D9  7  3D  4  10  0  0  10  C  2D  9  1F
4  10  0  0  FF  0  0  0  0  0  0  0
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AB  8  21  2  B6  0  0  10  D  AB  0  0
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0  10  C  2D  9  AB  4  10  0  0  10  C
2D  9  AB  4  10  0  0  FF  0  0  0  0
0  0  0  0  20  D  AB  5  6C  2  B6  0
0  10  D  AB  8  21  2  B6  0  0  8  D
AB  0  0  2  B6  0  0  8  D  AB  9  1F
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0  10  D  AB  8  21  2  B6  0  0  10  D
AB  7  3D  4  10  0  0  10  D  AB  9  1F
```

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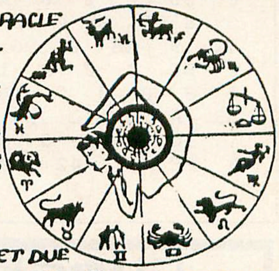

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```
4  10  0  0  FF  0  0  0  0  0  0  0
0  FE  41  42  40  40  60  0  0  0  8  A
D9  0  0  2  B6  0  0  8  0  0  0  0
2  B6  0  0  8  A  D9  0  0  2  B6  0
0  8  0  0  0  0  2  B6  0  0  8  10
42  9  AB  2  B6  0  0  8  0  0  9  AB
2  B6  0  0  8  10  42  9  AB  2  B6  0
0  8  0  0  9  AB  2  B6  0  0  20  15
B3  A  D9  2  B6  0  0  20  10  42  9  AB
4  10  0  0  FF  0  0  0  0  0  0  0
0  FE  40  42  40  40  60  0  0  0  8  A
D9  0  0  2  B6  0  0  8  0  0  0  0
2  B6  0  0  8  A  D9  0  0  2  B6  0
0  8  0  0  0  0  2  B6  0  0  8  10
42  9  AB  2  B6  0  0  8  0  0  9  AB
2  B6  0  0  8  10  42  9  AB  2  B6  0
0  8  0  0  9  AB  2  B6  0  0  20  15
B3  A  D9  2  B6  0  0  20  10  42  9  AB
4  10  0  0  FF  0  0  0  0  0  0  0
0  FE  43  42  40  40  60  0  0  0  8  D
AB  5  6C  2  B6  0  0  8  0  0  5  6C
2  B6  0  0  8  D  AB  5  6C  2  B6  0
0  8  0  0  5  6C  2  B6  0  0  8  D
AB  8  21  2  B6  0  0  8  0  0  8  21
2  B6  0  0  8  D  AB  8  21  2  B6  0
0  8  0  0  8  21  2  B6  0  0  20  D
AB  0  0  2  B6  0  0  8  C  2D  9  AB
4  10  0  0  8  0  0  9  AB  4  10  0
0  8  C  2D  9  AB  4  10  0  0  8  0
0  9  AB  4  10  0  0  FF  0  0  0  0
0  0  0  0  20  D  AB  5  6C  2  B6  0
0  10  D  AB  8  21  2  B6  0  0  8  D
AB  0  0  2  B6  0  0  8  D  AB  9  1F
2  B6  0  0  10  D  AB  8  21  2  B6  0
0  10  D  AB  8  21  2  B6  0  0  10  D
AB  7  3D  4  10  0  0  10  D  AB  9  1F
4  10  0  0  FF  0  0  0  0  0  0  0
0  FE  41  42  40  40  60  0  0  0  8  A
D9  0  0  2  B6  0  0  8  0  0  0  0
2  B6  0  0  8  A  D9  0  0  2  B6  0
0  8  0  0  0  0  2  B6  0  0  8  10
42  9  AB  2  B6  0  0  8  0  0  9  AB
2  B6  0  0  8  10  42  9  AB  2  B6  0
0  8  0  0  9  AB  2  B6  0  0  20  15
B3  A  D9  2  B6  0  0  20  10  42  9  AB
4  10  0  0  FF  0  0  0  0  0  0  0
0  FE  40  42  40  40  60  0  0  0  8  A
D9  0  0  2  B6  0  0  8  0  0  0  0
2  B6  0  0  8  A  D9  0  0  2  B6  0
0  8  0  0  0  0  2  B6  0  0  8  10
42  9  AB  2  B6  0  0  8  0  0  9  AB
2  B6  0  0  8  10  42  9  AB  2  B6  0
0  8  0  0  9  AB  2  B6  0  0  20  15
B3  A  D9  2  B6  0  0  8  10  42  9  AB
4  10  0  0  8  0  0  9  AB  4  10  0
0  FE  43  42  40  40  60  0  0  0  8  10
```

```
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4  10  0  0  FF  0  0  0  0  0  0  0
0  20  12  3F  A  D9  4  8F  0  0  10  12
3F  A  D9  0  0  0  0  8  D  AB  A  D9
0  0  0  0  8  0  0  A  D9  0  0  0
0  20  D  AB  A  D9  4  8F  0  0  20  D
AB  A  D9  0  0  0  0  FF  0  0  0  0
0  0  0  0  10  10  42  C  2D  3  6A  0
0  10  12  3F  C  2D  3  6A  0  0  10  10
42  C  2D  3  6A  0  0  10  E  7B  C  2D
3  6A  0  0  20  D  AB  A  D9  2  B6  0
0  10  D  AB  A  D9  2  B6  0  0  10  C
2D  9  AB  2  B6  0  0  FF  0  0  0  0
0  0  0  0  10  A  D9  9  1F  3  9E  0
0  10  0  0  9  1F  3  9E  0  0  20  A
D9  7  3D  3  9E  0  0  20  C  2D  7  3D
4  10  0  0  10  A  D9  7  3D  3  9E  0
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0  0  0  0  0  0  0  20  D  AB  8  9C
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0  8  21  4  8F  0  0  10  D  AB  8  21
4  10  0  0  10  C  2D  8  21  4  10  0
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D9  7  3D  3  9E  0  0  10  0  0  7  3D
3  9E  0  0  20  A  D9  5  6C  3  6A  0
0  20  E  7B  5  6C  3  B  0  0  10  D
AB  7  3D  4  10  0  0  10  C  2D  7  3D
4  10  0  0  FF  0  0  0  0  0  0  0
0  20  A  D9  5  6C  2  B6  0  0  20  15
B3  8  21  2  B6  0  0  10  15  B3  0  0
2  B6  0  0  10  15  B3  8  21  2  B6  0
0  20  13  56  7  3D  4  10  0  0  FF  0
0  0  0  0  0  0  0  20  15  B3  5  6C
2  B6  0  0  10  15  B3  8  21  2  B6  0
0  8  15  B3  0  0  2  B6  0  0  8  15
B3  9  1F  2  B6  0  0  10  15  B3  8  21
2  B6  0  0  10  15  B3  8  21  2  B6  0
0  10  A  D9  7  3D  4  10  0  0  10  C
2D  9  1F  4  10  0  0  FF  0  0  0  0
0  0  0  0  20  D  AB  5  6C  2  B6  0
0  20  D  AB  8  21  2  B6  0  0  10  D
AB  0  0  2  B6  0  0  10  D  AB  0  0
2  B6  0  0  10  C  2D  9  AB  4  10  0
0  10  C  2D  0  0  4  10  0  0  FF  0
0  0  0  0  0  0  0  20  D  AB  5  6C
2  B6  0  0  10  D  AB  8  21  2  B6  0
0  8  D  AB  8  21  2  B6  0  0  8  D
AB  9  1F  2  B6  0  0  10  D  AB  8  21
2  B6  0  0  10  D  AB  8  21  2  B6  0
0  10  D  AB  7  3D  4  10  0  0  10  D
AB  9  1F  4  10  0  0  FF  0  0  0  0
0  0  0  0  FE  41  42  40  40  60  0  0
0  8  A  D9  0  0  2  B6  0  0  8  0
0  0  0  2  B6  0  0  8  A  D9  0  0
2  B6  0  0  8  0  0  0  0  2  B6  0
```

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```
0 8 10 42 C 2D 2 B6 9 AB 8 0
0 C 2D 2 B6 9 AB 8 10 42 C 2D
2 B6 9 AB 8 0 0 C 2D 2 B6 9
AB 20 15 B3 D AB 2 B6 A D9 20 10
42 C 2D 4 10 9 AB FF 0 0 0 0
0 0 0 0 FE 40 42 40 40 60 0 0
0 8 A D9 0 0 2 B6 0 0 8 0
0 0 0 2 B6 0 0 8 A D9 0 0
2 B6 0 0 8 0 0 0 0 2 B6 0
0 8 10 42 C 2D 2 B6 9 AB 8 0
0 C 2D 2 B6 9 AB 8 10 42 C 2D
2 B6 9 AB 8 0 0 C 2D 2 B6 9
AB 20 15 B3 D AB 2 B6 A D9 20 10
42 C 2D 4 10 9 AB FF 0 0 0 0
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2 B6 5 6C 8 0 0 0 0 2 B6 5
6C 8 D AB A D9 2 B6 8 21 8 0
0 0 0 2 B6 8 21 8 D AB A D9
2 B6 8 21 8 0 0 0 0 2 B6 8
21 20 D AB A D9 2 B6 0 0 8 C
2D 9 AB 4 10 7 3D 8 0 0 0 0
4 10 7 3D 8 C 2D 9 AB 4 10 7
3D 8 0 0 0 0 4 10 7 3D FF 0
0 0 0 0 0 0 0 20 D AB A D9
2 B6 5 6C 10 D AB A D9 2 B6 8
21 8 D AB A D9 2 B6 8 21 8 D
AB A D9 2 B6 9 1F 10 D AB A D9
2 B6 8 21 10 D AB A D9 2 B6 8
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AB A D9 4 10 9 1F FF 0 0 0 0
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0 8 A D9 0 0 2 B6 0 0 8 0
0 0 0 2 B6 0 0 8 A D9 0 0
2 B6 0 0 8 0 0 0 0 2 B6 0
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0 C 2D 2 B6 9 AB 8 10 42 C 2D
2 B6 9 AB 8 0 0 C 2D 2 B6 9
AB 20 15 B3 D AB 2 B6 A D9 20 10
42 C 2D 4 10 9 AB FF 0 0 0 0
0 0 0 0 FE 40 42 40 40 60 0 0
0 8 A D9 0 0 2 B6 0 0 8 0
0 0 0 2 B6 0 0 8 A D9 0 0
2 B6 0 0 8 0 0 0 0 2 B6 0
0 8 10 42 C 2D 2 B6 9 AB 8 0
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2 B6 9 AB 8 0 0 C 2D 2 B6 9
AB 20 15 B3 D AB 2 B6 A D9 8 10
42 C 2D 4 10 9 AB 8 0 0 C 2D
4 10 9 AB FE 43 42 40 40 60 0 0
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0 C 2D 4 10 9 AB FF 0 0 0 0
0 0 0 0 20 12 3F A D9 4 8F 0
0 10 12 3F A D9 0 0 0 0 8 D
AB A D9 0 0 0 0 8 0 0 A D9
0 0 0 0 20 D AB A D9 4 8F 0
0 20 D AB A D9 0 0 0 0 FF 0
0 0 0 0 0 0 0 10 10 42 C 2D
3 6A 0 0 10 12 3F C 2D 3 6A 0
0 10 10 42 C 2D 3 6A 9 AB 10 E
7B C 2D 3 6A 9 AB 20 D AB A D9
2 B6 0 0 10 D AB A D9 2 B6 0
0 10 C 2D 9 AB 2 B6 0 0 FF 0
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3 9E 7 3D 10 0 0 9 1F 3 9E 7
3D 10 A D9 8 21 3 9E 7 3D 10 0
0 9 1F 3 9E 7 3D 20 C 2D 9 AB
4 10 7 3D 10 A D9 9 1F 3 9E 7
3D 10 C 2D 9 AB 3 9E 0 0 FF 0
0 0 0 0 0 0 0 20 D AB A 3D
3 6A 8 9C 20 D AB A 3D 3 6A 8
9C 20 D AB A D9 4 8F 9 1F 10 1B
57 A 3D 4 10 7 3D 10 18 5B A 3D
4 10 7 3D FF 0 0 0 0 0 0 0
0 20 15 B3 12 3F 3 6A A D9 20 15
B3 12 3F 3 6A A D9 20 15 B3 10 42
2 B6 A D9 20 15 B3 10 42 2 B6 A
D9 FF 1C F7 12 3F 3 B A 3D 20 1C
F7 12 3F 3 B A 3D 20 1B 57 10 42
4 10 A D9 20 0 0 0 0 3 B 0
0 20 18 5B E 7B 4 10 A 3D FF 0
0 0 0 0 0 0 0 20 15 B3 D AB
3 6A 5 6C 20 15 B3 D AB 3 6A 8
21 10 15 B3 D AB 3 6A 5 6C 10 15
B3 D AB 3 6A 8 21 10 13 56 C 2D
4 10 7 3D 10 13 56 C 2D 4 10 9
1F FF 0 0 0 0 0 0 0 0 20 15
B3 D AB 2 B6 5 6C 20 15 B3 D AB
2 B6 8 21 10 15 B3 D AB 2 B6 5
6C 10 15 B3 D AB 2 B6 8 21 10 13
56 C 2D 4 10 6 16 10 13 56 C 2D
4 10 6 16 FF 0 0 0 0 0 0 0
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B3 0 0 2 B6 8 21 10 15 B3 A D9
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20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20 20 20 20
20 20 20 0 0 FF 0 0 0 0 FF FF
```

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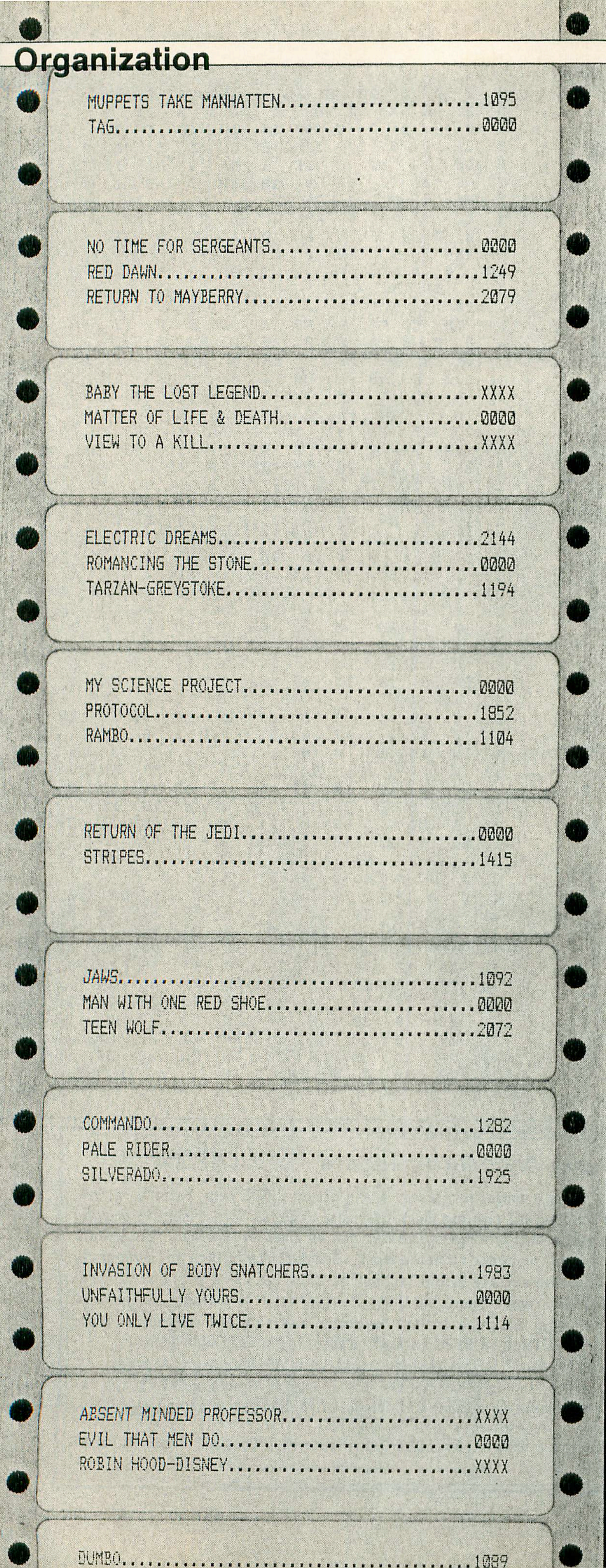


```
MUPPETS TAKE MANHATTEN.......................1095
TAG..........................................0000

NO TIME FOR SERGEANTS........................0000
RED DAWN.....................................1249
RETURN TO MAYBERRY...........................2079

BABY THE LOST LEGEND.........................XXXX
MATTER OF LIFE & DEATH.......................0000
VIEW TO A KILL...............................XXXX

ELECTRIC DREAMS..............................2144
ROMANCING THE STONE..........................0000
TARZAN-GREYSTOKE.............................1194

MY SCIENCE PROJECT...........................0000
PROTOCOL.....................................1852
RAMBO........................................1104

RETURN OF THE JEDI...........................0000
STRIPES......................................1415

JAWS.........................................1092
MAN WITH ONE RED SHOE........................0000
TEEN WOLF....................................2072

COMMANDO.....................................1282
PALE RIDER...................................0000
SILVERADO....................................1925

INVASION OF BODY SNATCHERS...................1983
UNFAITHFULLY YOURS...........................0000
YOU ONLY LIVE TWICE..........................1114

ABSENT MINDED PROFESSOR......................XXXX
EVIL THAT MEN DO.............................0000
ROBIN HOOD-DISNEY............................XXXX

DUMBO........................................1089
```

That's Entertain

By Randy Mayfield

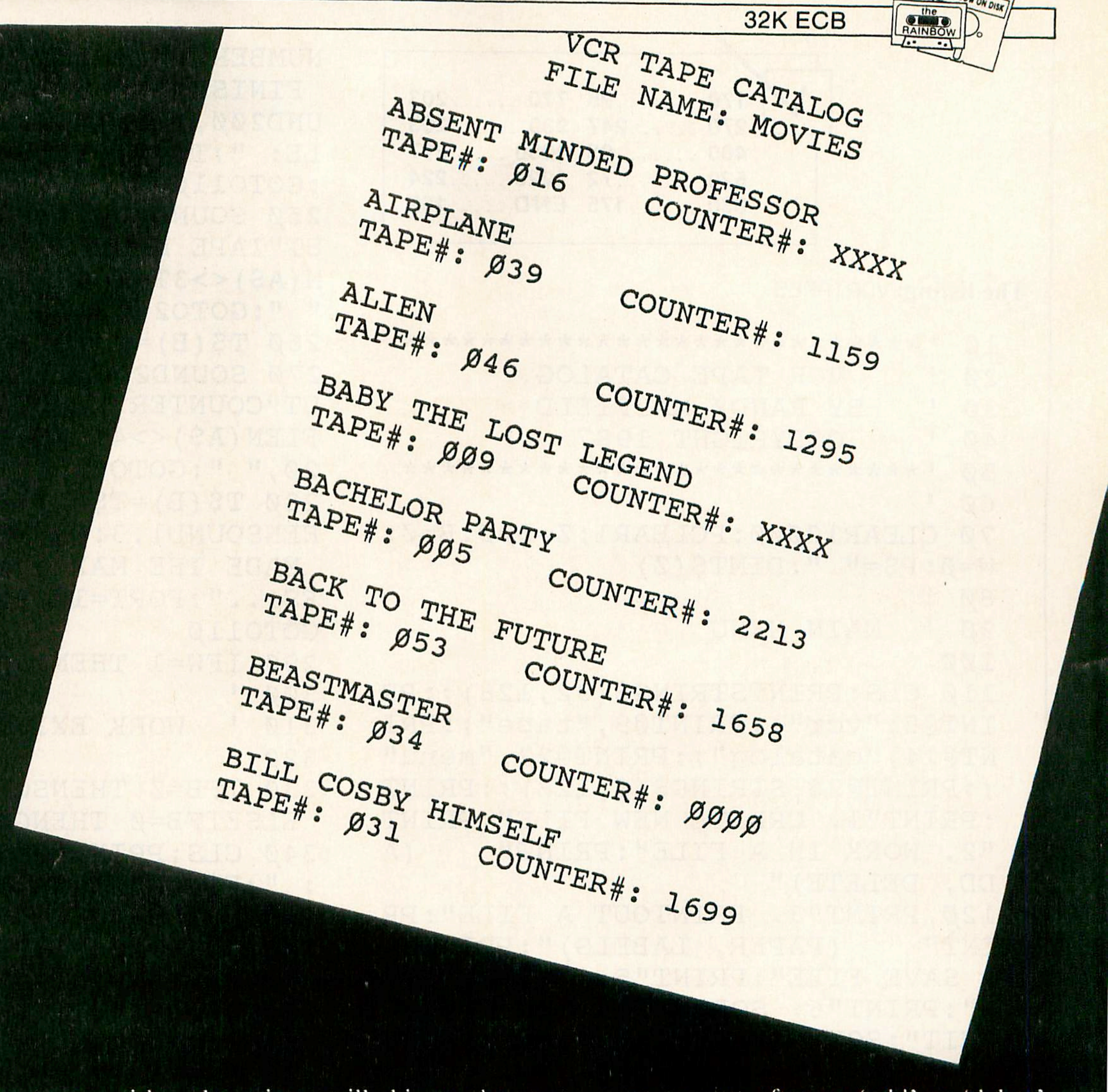
If you own a video cassette recorder and have ever experienced the frustration of searching through a shelf full of video cassettes for a particular recording, you need *VCR Tapes*. This program maintains (on disk or tape) a file of up to 500 movie titles detailing which video cassettes they are on and the starting VCR digital counter value of each title.

The first step in setting up your *VCR Tapes* system is numbering your video cassettes. I use the pre-printed stick-on numbers included with each new cassette. Then type in and save `VCRTAPES` and run it. The program is menu-driven, with the main menu offering seven options:

Create new file — allows you to enter a title, tape number (###) and VCR digital counter reading (####) for each

---

Randy Mayfield is a radar electronics technician living in Melbourne, Florida, with his wife and two children. His hobbies include target shooting, woodworking and programming for the CoCo.



```
VCR TAPE CATALOG
FILE NAME: MOVIES
ABSENT MINDED PROFESSOR
TAPE#: 016          COUNTER#: XXXX
AIRPLANE
TAPE#: 039          COUNTER#: 1159
ALIEN
TAPE#: 046          COUNTER#: 1295
BABY THE LOST LEGEND
TAPE#: 009          COUNTER#: XXXX
BACHELOR PARTY
TAPE#: 005          COUNTER#: 2213
BACK TO THE FUTURE
TAPE#: 053          COUNTER#: 1658
BEASTMASTER
TAPE#: 034          COUNTER#: 0000
BILL COSBY HIMSELF
TAPE#: 031          COUNTER#: 1699
```

ment

recording. You must enter the tape numbers and counter numbers in the formats shown in parentheses, as all the information is compressed into a single string for conserving string space and for ease of storage.

Work in a file — use to update the file as your video cassette library grows and changes. The 'add' option has the same format as the Create function. The 'delete' option has the same format as the Scroll function, allowing you to scroll through the file and find the title to be deleted.

Printout file — the 'paper' option prints a hard copy listing of all recorded titles with tape numbers and counter numbers. The routine uses fanfold printer paper, skips perforations and prints 18 titles per page. The 'labels' option will print titles and their corresponding counter numbers for any video cassette you choose. The routine is for standard 3½-by-$^{15}/_{16}$ inch fanfold labels, using a condensed printer character set (16.7 cpi) to allow lengthy titles to fit on the labels, and prints up to four titles per label. If a tape contains more than four titles, the printer will skip to the next label and continue printing. DMP-105 printer control codes for baud rate, condensed characters enable and condensed characters disable are located within lines 490, 610 and 690, respectively. Change these codes as required for other printers.

Save file — use to save your file to disk or tape. When a file is saved, you then have an option of keeping that file in RAM or erasing it. This allows the flexibility of creating a file or working on another one without having to restart the program (after 'erase') or to return to work on the file just saved (after 'retain').

Scroll file — allows scrolling forward and backward through a file on the CoCo video screen to find a title and its corresponding tape and counter numbers. This function is especially useful to those who do not have a printer to produce hard copy.

Sort file — uses a Shell-Metzner sorting algorithm to sort titles in alphabetical order. This is included as a menu selection, because you may not always want to sort after an 'add' or 'delete' operation if only a few titles are involved.

Quit — use to exit the program. If a file is in RAM, you will be given the opportunity to return to the Save function, just in case you forgot to save the file.

If any of the Work, Printout, Scroll or Sort functions are chosen when no file is in RAM, program execution takes you to the 'load file' subroutine and you will be prompted to load an existing file from disk or tape. The program uses high-pitched beeps to prompt for keyboard response and a low-pitched tone to indicate erroneous entries.

VCR Tapes could also be used to catalog your computer cassettes or disks, although the printer labels option would require adjustments if different size labels are used.

(Questions or comments may be directed to the author at 1881 Player Circle North, Melbourne, FL 32935. Please enclose an SASE when requesting a reply.) ☐

170	95	770	203
270	247	930	203
400	95	1050	217
520	72	1220	224
630	175	END	162

The listing: VCRTAPES

```
10 '****************************
20 '     VCR TAPE CATALOG
30 '    BY RANDY MAYFIELD
40 '      COPYRIGHT 1987
50 '****************************
60 '
70 CLEAR10000:PCLEAR1:Z=500:B=0:
W=0:P$=".":DIMT$(Z)
80 '
90 '  MAIN MENU
100 '
110 CLS:PRINTSTRING$(32,128);:PR
INT@5,"vcr";:PRINT@9,"tape";:PRI
NT@14,"catalog";:PRINT@22,"menu"
;:PRINT@26,STRING$(6,128);:PRINT
:PRINT"1. CREATE NEW FILE":PRINT
"2. WORK IN A FILE":PRINT"    (A
DD, DELETE)"
120 PRINT"3. PRINTOUT A FILE":PR
INT"    (PAPER, LABELS)":PRINT"4
. SAVE FILE":PRINT"5. SCROLL FIL
E":PRINT"6. SORT FILE":PRINT"7.
QUIT":SOUND200,1:PRINT:PRINT"SEL
ECT ONE "
130 R$=INKEY$:IFR$=""THEN130
140 X=VAL(R$):IFX<1ORX>7THENGOSU
B1360:GOTO110
150 ON X GOTO190,330,490,740,890
,1070,1000
160 '
170 '  CREATE NEW FILE
180 '
190 IFB=0THEN 210 ELSECLS:SOUND1
,3:PRINT"A FILE ALREADY EXISTS I
N RAM!!  YOU MUST 'SAVE' IT OR A
BANDON IT('QUIT') TO ENABLE CREA
TION OF ANEW FILE!!":PRINT:PRINT
"PRESS ANY KEY FOR MAIN MENU."
200 IF INKEY$=""THEN200ELSE110
210 B=1:CLS:SOUND200,1:INPUT"NAM
E NEW FILE: ";F$:IFLEN(F$)>8THEN
GOSUB1360:GOTO210
220 CLS:PRINT"new FILE: ";F$:GOT
O240
230 CLS:PRINT"add TO FILE: "F$
240 PRINT@32,"ENTER TITLES (NO C
OMMAS),":PRINT"         TAPE NUMBER
S,":PRINT"      AND VCR COUNTER
NUMBERS.":PRINT"HIT <ENTER> WHEN
 FINISHED.":PRINT"ENTRY#: ";B:SO
UND200,1:PRINT@192,"";:INPUT"TIT
LE: ";T$(B):IFT$(B)=""THEN B=B-1
:GOTO110
250 SOUND200,1:PRINT@256,"";:INP
UT"TAPE NUMBER (###): ";A$:IF LE
N(A$)<>3THENGOSUB1360:PRINT@256,
" ":GOTO250
260 T$(B)=T$(B)+A$
270 SOUND200,1:PRINT@320,"";:INP
UT"COUNTER NUMBER (####): ";A$:I
FLEN(A$)<>4THENGOSUB1360:PRINT@3
20," ":GOTO270
280 T$(B)=T$(B)+A$:B=B+1:IFB>Z T
HENSOUND1,3:PRINT:PRINT"YOU HAVE
 MADE THE MAXIMUM NUMBEROF ENTRI
ES...":FORT=1TO2000:NEXTT:B=B-1:
GOTO110
290 IFW=1 THEN230ELSE220
300 '
310 '  WORK EXISTING FILE
320 '
330 IFB=Z THENSOUND150,1:GOTO110
 ELSEIFB=0 THENGOSUB1280
340 CLS:PRINT"work EXISTING FILE
: ";F$:PRINT@32,"1. ADD":PRINT"2
. DELETE":PRINT"3. MAIN MENU":PR
INT:SOUND200,1:PRINT"SELECT ONE"
350 R$=INKEY$:IFR$=""THEN350
360 W=VAL(R$):IFW<1ORW>3THENGOSU
B1360:GOTO340
370 IFW=3 THEN110ELSEIFW=1 THENC
LS:B=B+1:GOTO230 ELSEX=0
380 CLS:X=X+1:PRINT"FIND TITLE T
O delete":PRINT:PRINT"     UP-AR
ROW = SCROLL FORWARD":PRINT"   D
OWN-ARROW = SCROLL BACK":PRINT"
           D = DELETE":PRINT"ANY
 OTHER KEY = MAIN MENU":SOUND 20
0,1:GOTO940
390 CLS:PRINT"delete: ";MID$(T$(
X),1,L):PRINT"ARE YOU SURE (Y/N)
?":SOUND200,1
400 R$=INKEY$:IFR$=""THEN400
410 IFR$="N"THEN380ELSEIFR$="Y"T
HEN420ELSEGOSUB1360:GOTO390
420 A$=MID$(T$(X),L+1,3):D$=MID$
(T$(X),1,L):FOR Y=X TO B-1:T$(Y)
=T$(Y+1):NEXT Y:B=B-1
430 CLS:PRINT@32,D$:PRINT"HAS BE
EN DELETED":PRINT"FROM TAPE NUMB
ER ";A$:PRINT:PRINT:SOUND200,1:P
RINT"WANT TO DELETE ANOTHER (Y/N
)?"
440 R$=INKEY$:IFR$=""THEN440
450 IFR$="N"THEN340ELSEIFR$="Y"T
```

```
HENX=X-1:GOTO380ELSEGOSUB1360:GO
TO430
460 '
470 '  PRINT-OUT FILE
480 '
490 POKE150,18 ' THIS POKE FOR
DMP-105 PRINTER 2400 BAUD
500 IFB=0THENGOSUB1280
510 CLS:PRINT"print FILE: ";F$:P
RINT"1. PRINT ON PAPER":PRINT"2.
 PRINT ON LABELS":PRINT"3. MAIN
MENU":PRINT:SOUND200,1:PRINT"SEL
ECT ONE"
520 R$=INKEY$:IFR$=""THEN520
530 X=VAL(R$):IFX<1ORX>3THENGOSU
B1360:GOTO510
540 IFX=3THEN110ELSEPRINT@192,"I
S PRINTER ON & READY?":SOUND200,
1:PRINT"HIT ANY KEY WHEN READY."
550 IF INKEY$=""THEN550
560 IFX=2THEN610
570 CLS:PRINT@260,"PRINTING:  ";
F$:PRINT#-2,TAB(32)"VCR TAPE CAT
ALOG":PRINT#-2,TAB(32)"FILE NAME
: ";F$:PRINT#-2:Y=1
580 FORX=1TOB:L=LEN(T$(X))-7:PRI
NT#-2,TAB(15)MID$(T$(X),1,L):PRI
NT#-2,TAB(15)"TAPE#: ";MID$(T$(X
),L+1,3);:PRINT#-2,"     ";:PRINT
#-2,"COUNTER#: ";RIGHT$(T$(X),4)
:PRINT#-2:Y=Y+1:IFY=18THEN600
590 NEXTX:GOTO510
600 FORT=1TO16:PRINT#-2:NEXTT:Y=
1:GOTO590
610 PRINT#-2,CHR$(27)CHR$(20) '
 CONTROL CODES FOR DMP-105 PRINT
ER CONDENSED CHAR. ENABLE
620 Y=1:CLS:PRINT"labels FOR: ";
F$:PRINT:PRINT"ENTER TAPE NUMBER
, AND THE      LABEL(S) FOR THAT
 TAPE WILL BE  PRINTED.":PRINT"H
IT <ENTER> WHEN FINISHED.":PRINT
:PRINT:SOUND200,1:INPUT"TAPE NUM
BER (###): ";R$
630 IFR$=""THEN690ELSEIFLEN(R$)<
>3 THENGOSUB1360:GOTO620
640 FORX=1TOB:L=LEN(T$(X))-6:IFM
ID$(T$(X),L,3)=R$THENA$=MID$(T$(
X),1,L-1):GOTO660
650 NEXTX:FORT=1TO7-Y:PRINT#-2:N
EXTT:GOTO620
660 A$=A$+P$:IFLEN(A$)>45THENA$=
LEFT$(A$,45):GOTO670ELSE660
670 IFY<5THENPRINT#-2,A$;:PRINT#
-2,RIGHT$(T$(X),4):Y=Y+1:GOTO650
680 PRINT#-2:PRINT#-2:Y=1:GOTO67
0
690 PRINT#-2,CHR$(27)CHR$(19) '
 CONTROL CODES FOR DMP-105 PRINT
ER CONDENSED CHAR. DISABLE
700 GOTO510
710 '
720 '  SAVE FILE
730 '
740 IFB>0THEN760ELSECLS:SOUND1,3
:PRINT"NO FILE IN RAM TO SAVE!!"
:PRINT:PRINT"PRESS ANY KEY FOR M
AIN MENU":SOUND200,1
750 IF INKEY$=""THEN750 ELSE110
760 CLS:PRINT"save FILE: ";F$:PR
INT"WANT TO RENAME (Y/N)?":SOUND
200,1
770 R$=INKEY$:IFR$=""THEN770
780 IFR$="Y"THEN790ELSEIFR$="N"T
HEN810ELSEGOSUB1360:GOTO760
790 PRINT:SOUND200,1:INPUT"ENTER
 NEW NAME: ";M$:IFLEN(M$)>8THENG
OSUB1360:GOTO760
800 F$=M$:CLS:PRINT"SAVE FILE: "
;F$
810 GOSUB1170:OPEN"O",#D,F$
820 FORX=1TOB:PRINT#D,T$(X):NEXT
X:CLOSE#D:CLS:PRINTF$" SAVED":PR
```

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CoCo 2

CoCo 3

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```
INT:PRINT"1. RETAIN FILE IN RAM"
:PRINT"2. ERASE FILE IN RAM":PRI
NT:PRINT"SELECT ONE":SOUND200,1
830 R$=INKEY$:IFR$=""THEN830
840 X=VAL(R$):IFX<1 OR X>2 THENG
OSUB1360
850 IFX=1THEN110ELSE FOR T=1TOB:
T$(T)="":NEXTT:B=0:W=0:GOTO110
860 '
870 '  SCROLL FILE
880 '
890 X=1:IFB=0THENGOSUB1280
900 CLS:PRINT"scroll FILE: ";F$:
PRINT:PRINT"     UP-ARROW = SCRO
LL FORWARD":PRINT"   DOWN-ARROW
= SCROLL BACK":PRINT"ANY OTHER K
EY = MAIN MENU":SOUND200,1:W=0:G
OTO940
910 R$=INKEY$:IFR$=""THEN910
920 IFR$=CHR$(94)THENX=X+1:GOTO9
30ELSEIFR$=CHR$(10)THENX=X-1:GOT
O930ELSEIFR$="D" AND W=2 THEN390
 ELSE110
930 IF X>B THEN X=1 ELSE IF X<1
THEN X=B
940 IFT$(X)=""THEN950ELSEPRINT@2
56," ":L=LEN(T$(X))-7:PRINT@224,
"TITLE: ";MID$(T$(X),1,L):PRINT@
288,"TAPE#: ";MID$(T$(X),L+1,3):
PRINT@352,"CNTR#: ";RIGHT$(T$(X)
,4):GOTO910
950 CLS:SOUND1,3:PRINT"YOU HAVE
DELETED ALL TITLES IN":PRINTF$;"
 !!":PRINT"IT HAS BEEN ABANDONED
 IN RAM.":PRINT:PRINT"HIT ANY KE
Y FOR MAIN MENU.":B=0:W=0:F$=""
960 IF INKEY$=""THEN960ELSE110
970 '
980 '  QUIT
990 '
1000 CLS:PRINT"THANK YOU.":IFB>0
THENPRINT:PRINT"P.S.  DID YOU SA
VE ";F$;" ?":PRINT"PRESS 'S' TO
RETURN AND SAVE IT,ANY OTHER KEY
 TO QUIT.":SOUND200,1
1010 R$=INKEY$:IFR$=""THEN1010
1020 IFR$="S"THEN760ELSECLS:PRIN
T"THANK YOU":END
1030 '
1040 ' SHELL-METZNER SORT
1050 '
1060 IFB=0 THENGOSUB1280
1070 CLS:PRINT@70,"SORTING TITLE
S IN":PRINT@102,"ALPHABETICAL OR
DER.":PRINT@201,"PLEASE WAIT..."
:S1=B
1080 S1=INT(S1/2):IF S1=0THEN113
0 ELSE S4=1:S3=B-S1
1090 S5=S4
1100 S2=S5+S1:IF MID$(T$(S5),1)
< MID$(T$(S2),1) THEN1120ELSE111
0
1110 M$=T$(S5):T$(S5)=T$(S2):T$(
S2)=M$:S5=S5-S1:IF S5<1 THEN1120
 ELSE1100
1120 S4=S4+1:IF S4>S3 THEN1080EL
SE1090
1130 CLS:PRINT@70,"SORT COMPLETE
D":SOUND150,1:FOR T=1TO2000:NEXT
T:GOTO110
1140 '
1150 'DISKTAPE SELECT SUBROUTINE
1160 '
1170 PRINT@32,"1. DISK":PRINT"2.
 TAPE":PRINT:SOUND200,1:PRINT"SE
LECT ONE"
1180 R$=INKEY$:IFR$=""THEN1180
1190 D=VAL(R$):IFD<1ORD>2THENGOS
UB1360:GOTO1170
1200 PRINT:IFD=2THEN1220
1210 PRINT"DISKETTE LATCHED IN P
LACE?":GOTO1230
1220 D=-1:PRINT"POSITION TAPE":I
FB=0THENPRINT"PRESS PLAY BUTTON"
ELSEPRINT"PRESS RECORD & PLAY BU
TTONS"
1230 SOUND200,1:PRINT"HIT ANY KE
Y WHEN READY"
1240 IF INKEY$=""THEN1240ELSERET
URN
1250 '
1260 '  LOAD FILE SUBROUTINE
1270 '
1280 CLS:PRINT"load EXISTING FIL
E":SOUND200,1:INPUT"ENTER FILENA
ME: ";F$:IFLEN(F$)>8THENGOSUB136
0:GOTO1280
1290 CLS:PRINT"LOAD EXISTING FIL
E: ";F$:GOSUB1170:OPEN"I",#D,F$:
B=1
1300 IF EOF(D)=-1 THEN1320
1310 INPUT#D,T$(B):B=B+1:GOTO130
0
1320 CLOSE#D:B=B-1:RETURN
1330 '
1340 'INCORRECT ENTRY SUBROUTINE
1350 '
1360 SOUND1,3:PRINT@416,"INCORRE
CT ENTRY":PRINT@448,"PRESS ANY K
EY TO TRY AGAIN...":SOUND1,3
1370 IF INKEY$=""THEN1370
1380 PRINT@416," ":PRINT@448," "
:RETURN
```

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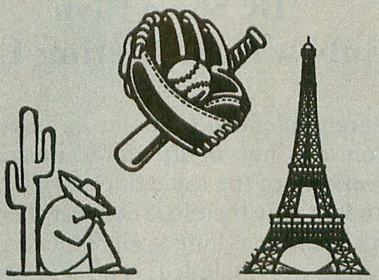

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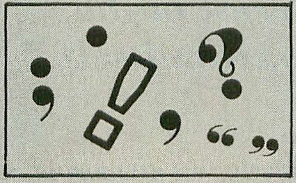

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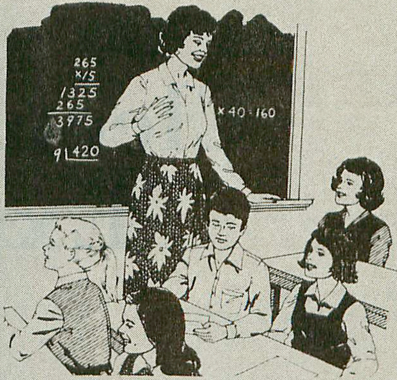

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Electricity and Circuit Experimentation

By Steve Blyn
Rainbow Contributing Editor

Computers are completely dependent on circuits. A circuit is a path or line of electric current. A complete or closed circuit is a path that makes an entire "circular" path returning back to its origin.

This month's program introduces youngsters to the world of electricity and circuits. Students are asked to draw a complete circuit using a dry cell and two light bulbs. When their circuit is complete, the bulbs light up.

A dry cell is illustrated in this program since it is the familiar source of electricity used in classrooms and by hobbyists. The first wire emanates from the negative pole of the dry cell, because electricity flows from negative to positive. Electricity may be thought of as the flow of negative ions.

The student uses the arrow keys to draw dotted lines, which represent real wires. Each time a wire is connected to a terminal, the computer beeps: The beeps act as clues that the student is on the right path.

Upon returning to the positive terminal of the dry cell, the student finds out whether he or she completed the circuit in an acceptable manner. If the circuit is complete, the light bulbs will light up. The student may then either press the 'E' key to end the program or the ENTER key to begin again.

Bear in mind that this program is merely intended to act as an introduction. It is not an attempt to present an overview of the topic of electricity. The student may therefore connect the wires in any order as long as all of the terminal points are included. The shortest or easiest path to completing the circuit is left for you to discuss with the student.

> ***"It often helps to involve the students in the programming to ensure their interest in the program itself."***

Similarly, no attempt is made to distinguish between series and parallel circuits. Again, you may bring this topic up with the student at your own discretion. It is always interesting for the student to observe that there are several ways to successfully complete this circuit on the screen as well as in reality. Experimentation should always be encouraged. In short, you can use this program at any level of sophistication you feel is appropriate.

The program is quite straightforward and uncomplicated. Lines 40 through 210 draw the dry cell and the two light bulbs. Lines 30 and 220 set the initial wire at screen location 1,158. This is at the negative terminal. The dotted line I chose to represent the wiring is `CHR$(130)`. You may experiment with other `CHR$`s if you feel like being creative. It often helps to involve the students in the programming to ensure their interest in the program itself.

The wiring is moved by lines 230 to 270. The `CHR$`s numbered 8, 9, 10 and 94 represent the four directional arrows. The computer checks at this point to see if any of the arrows are pressed and moves the wiring one space in that direction.

Lines 280 to 300 check to see if the student has left the boundaries of the screen. If so, his or her turn has ended (this was done to prevent aimless pressing of the arrow keys). Lines 330 to 400 check to see whether any of the terminal points have been met. A pleasant sound accompanies each terminal meeting.

The positive terminal point of the dry cell is located at screen location 1,186. When this point is met, the program checks to see if all of the other terminals were encountered (connected). If they were connected, the student is assumed to be correct. We say "assumed" because the student could have purposely taken an absurd but nevertheless technically correct path. If, on the other hand, all of the terminals have not been connected, then the student could not possibly be correct. Line 410 checks to see if all of the terminals are connected and reports whether the student is correct.

We hope that you and your children find this program a pleasant way to help introduce the topic of circuits, and we suggest that you help them with it at first. Hopefully, you can help them to build an electrical vocabulary, gain a little knowledge about circuitry and have some fun all at the same time. ☐

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: CIRCUIT

```
10 REM COMPLETE THE CIRCUIT
20 REM STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1987
30 N=1158:REM INITIAL DOT
40 CLS0:PRINT@0,"     COMPLETE T
HE CIRCUIT"
50 FOR T=1056 TO 1087:POKET,255:
NEXT T:REM TOP
60 FOR T=1472 TO 1503:POKE T,255
:NEXT T:REM BOTTOM
70 FOR X=4 TO 14:FOR Y=12 TO 25:
SET(X,Y,3):NEXT Y,X
80 PRINT@291,"dry";
90 PRINT@355,"cell";
100 SET(5,11,7):SET(11,11,7):SET
(5,10,7):SET(11,10,7)
110 POKE 1187,43:POKE 1190,45
120 FOR T=30 TO 40:SET(T,14,3):N
EXT T:REM DRAW THE LIGHTBULBS
130 FOR X=33 TO 37:FOR Y=8 TO 12
:SET(X,Y,5):NEXT Y,X
140 RESET(33,8):RESET(37,8):RESE
T(33,12):RESET(37,12):RESET(33,1
1):RESET(37,11)
150 FOR T=32 TO 38:SET(T,13,2):N
EXT T
160 FOR T=44 TO 54:SET(T,24,3):N
EXT T
170 FOR X=47 TO 51:FOR Y=18 TO 2
2:SET(X,Y,5):NEXT Y,X
180 RESET(47,18):RESET(51,18):RE
SET(47,22):RESET(51,22):RESET(47
,21):RESET(51,21)
190 FOR T=46 TO 52:SET(T,23,2):N
EXT T
200 POKE 1264,43:POKE 1267,45
210 POKE 1431,43:POKE1434,45
220 POKE N,130
230 EN$=INKEY$
240 IF EN$=CHR$(9) THEN N=N+1
250 IF EN$=CHR$(8) THEN N=N-1
260 IF EN$=CHR$(10) THEN N=N+32
270 IF EN$=CHR$(94) THEN N=N-32
280 REM PROTECT BOUNDARIES
290 IF N<1088 THEN SOUND 100,5:G
OTO 500
300 IF N>1472 THEN SOUND 100,5:G
OTO 500
310 POKE N,130
320 IF EN$=CHR$(13) THEN 420
330 REM CHECK TERMINAL POINTS
340 A=PEEK(1264):B=PEEK(1267):C=
PEEK(1431):D=PEEK(1434):E=PEEK(1
186)
350 IF A=130 THEN POKE1264,88:SO
UND 200,3
360 IF B=130 THEN POKE1267,88:SO
UND 200,3
370 IF C=130 THEN POKE1431,88:SO
UND 200,3
380 IF D=130 THEN POKE1434,88:SO
UND 200,3
390 IF E=130 THEN POKE 1186,88
400 IF E=88 THEN 410 ELSE 230
410 IF E=88 AND A=88 AND B=88 AN
D C=88 AND D=88 THEN 420 ELSE 43
0
420 PRINT@0,"          CORRECT ! "
:GOTO 440
430 PRINT@0,"   SORRY, PLEASE TR
Y AGAIN":GOTO 500
440 EN$=INKEY$
450 IF EN$="E" THEN 520 ELSE IF
EN$=CHR$(13) THEN RUN
460 SET(36,9,1):SET(35,11,1):SET
(50,19,1):SET(49,20,1)
470 FOR T=1 TO 35:NEXT T
480 SET(36,9,8):SET(35,11,8):SET
(50,19,8):SET(49,20,8)
490 GOTO 440
500 EN$=INKEY$
510 IF EN$="E" THEN 520 ELSE IF
EN$=CHR$(13) THEN RUN ELSE 500
520 END
```

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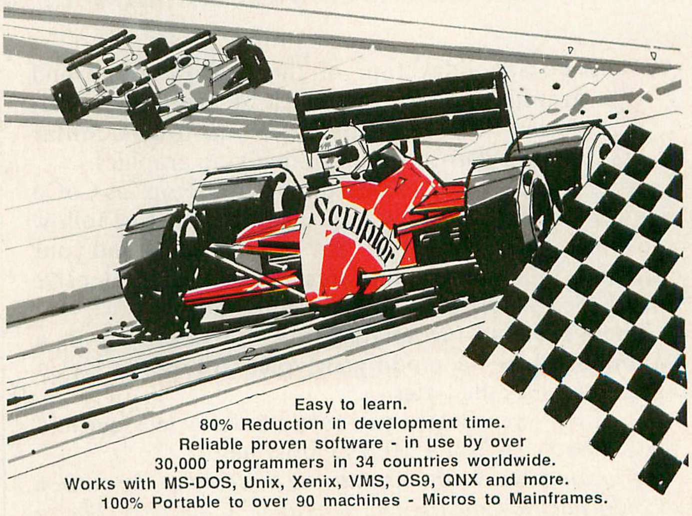

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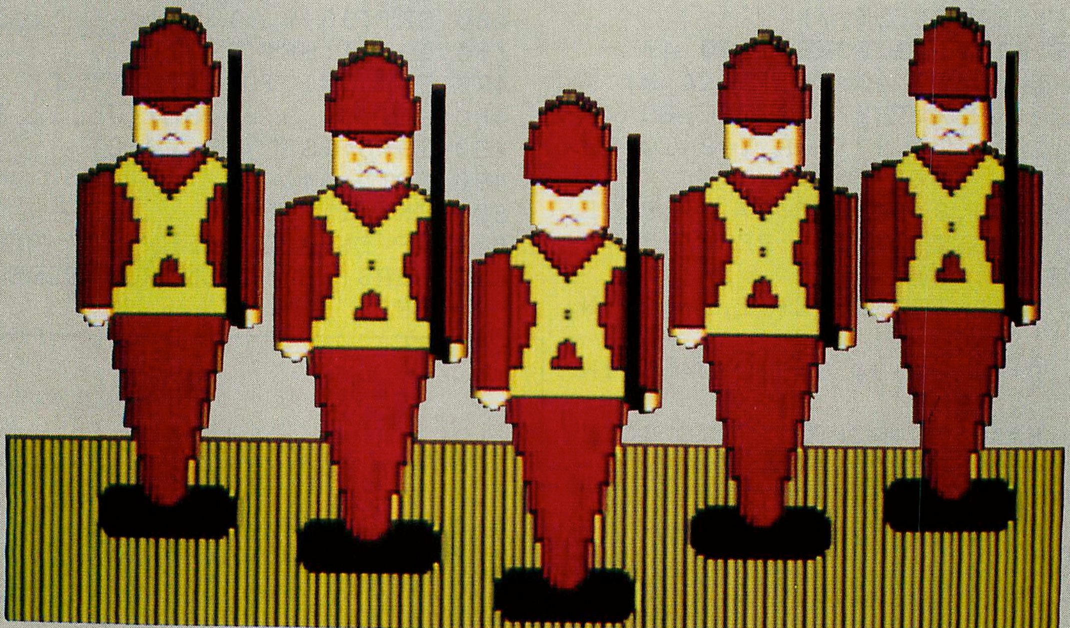
A Christmas Potpourri

By Ruth E. Golias



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Then hark as the angels sing "It Came Upon a Midnight Clear," and add your voice to theirs as CoCo again furnishes the lyrics.

The final screen leaves you with a holiday message and plays "We Wish You a Merry Christmas."

(Questions or comments may be directed to the author at 2826 Pacific Coast Hwy., Torrance, CA 90505. Please enclose an SASE when requesting a reply.) ☐

Ruth Golias has retired from the Torrance Police Department where she did microfilming. She is learning to program her CoCo and it has become her hobby.

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390	**119**	**2100**	**20**
670	**157**	**2270**	**34**
770	**156**	**2490**	**4**
1100	**190**	**2730**	**121**
1370	**55**	**END**	**240**
1680	**168**		

The listing: `XMASPORI`

```
1 '********************************
2 '*   A CHRISTMAS POTPOURRI      *
3 '*            BY                *
4 '*      RUTH E. GOLIAS          *
5 '* 2826 PACIFIC COAST HIGHWAY*
6 '* TORRANCE, CALIFORNIA 90505*
7 '********************************
```

```
8 '
9 '***** MERRY CHRISTMAS *******
10 ON BRK GO TO 2960
20 GOSUB2560
30 HSCREEN2:PALETTE CMP
40 PALETTE O,40
50 FOR X=1 TO 6
60 HCOLOR 4
70 HDRAW"S8;BM151,60;XAA$;"
80 HDRAW"BM101,80;XX2$;"
90 HDRAW"BM93,130;XX3$;"
100 HCOLOR 3
110 HDRAW"BM152,61;XAA$;"
120 HDRAW"BM102,81;XX2$;"
130 HDRAW"BM94,131;XX3$;"
140 NEXT X
150 FOR D=1 TO 500:NEXT D
160 '
170 '*** UP ON THE HOUSE-TOP ***
180 GOSUB2560
190 HSCREEN2:PALETTE 0,56:PALETT
E 8,8
200 HCOLOR 8
210 HPRINT(8,12)," 'UP ON THE HO
USE-TOP'"
220 FOR D=1 TO 1000:NEXT D
230 HCLS0:HCOLOR 8
240 FOR X=1 TO 2
250 HPRINT(3,1),"UP ON THE HOUSE
-TOP REINDEER PAUSE,"
260 PLAY"T3V30;O2L4GL8GAL4GECEL2
G"
270 HPRINT(3,3),"OUT JUMPS GOOD
OLD SANTA CLAUS;"
280 PLAY"L4AAGEDGL2G"
290 HPRINT(3,5),"DOWN THRO' THE
CHIMNEY"
300 PLAY"L4GL8GAL4GL8E"
310 HPRINT(3,7),"WITH LOTS OF TO
YS,"
320 PLAY"DL4CEL2G"
330 HPRINT(3,9),"ALL FOR THE LIT
TLE ONES,"
340 PLAY"L4AL8AAGGL4E"
350 HPRINT(3,11),"CHRISTMAS JOYS
."
360 PLAY"DGL2C"
370 HPRINT(3,13),"HO,HO,HO! WHO
WOULDN'T GO!"
380 PLAY"L4FFL2AL4GL8GGL2E"
390 HPRINT(3,15),"HO,HO,HO! WHO
WOULDN'T GO."
400 PLAY"L4DFL2FL4EL8GGL4CE"
410 HPRINT(3,17),"UP ON THE HOUS
E-TOP,"
420 PLAY"GL8GAL4GE"
430 HPRINT(3,19),"CLICK,CLICK,CL
ICK,"
440 PLAY"FGL2A"
450 HPRINT(3,21),"DOWN THRO' THE
 CHIMNEY"
460 PLAY"L4GL8GAGGL4"
470 HPRINT(3,24),"WITH GOOD SAIN
T NICK."
480 PLAY"L4EDGL2C"
490 FOR D=1 TO 500:NEXT D
500 HCOLOR 0
510 NEXT X
520 HCLS2
530 HCOLOR 4
540 HPRINT(5,10)," H A P P Y   H
 O L I D A Y S "
550 HPRINT(0,2),STRING$(40,"V")
560 HPRINT(0,21),STRING$(40,"V")
570 FOR D=1 TO 500:NEXT D
580 '
```

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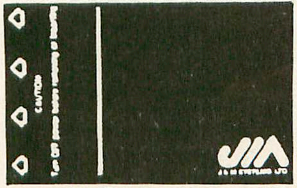

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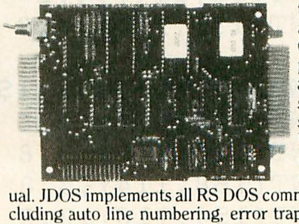

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```
590 '****** TOY SOLDIERS *******
600 GOSUB2560
610 PALETTE 0,5:PALETTE 8,0
620 HSCREEN2:HCLS0
630 HCOLOR 1
640 FOR B=0 TO 320 STEP3
650 HLINE(B,140)-(B,191),PSET
660 NEXT B
670 A1$="C8;R5F2D3G2L17H2U3E2R5D
1F1FR3E1EU1;U4RU4RU4RU4RU4RU4;L1
7D4RD4RD4RD4RD4RD4;BU24L5G2LH2UR
5DU20L3G2D17;BR5U3R2U3RU3RU3LU3L
U2L2U2;E2RDRDRDRDRDRDRURURURURUR
URF2D2L2D2L1D3L1D3R1D3R1D3R2D4"
680 A2$="U36R2D33DFD3L1H2BU4BL6L
5U1E1UEBU3URDLBD3R1;FDF1D1BU7BL2
BD13BR11R1E1U2NL2U18HL2BU10BL6F1
D5GNF1LG1L5H1L1NG1HU5E1;F1RF1R3E
1RE1L11;U4EU2EU1ER1E1R1NURNUR1F1
R1FD1FD2FD4L1;BD3BL3DBL5UBD3BR1E
RF"
690 HDRAW"BM70,16;S6;XTT$;BR3;BD
9;XO$;BR8;BU2;XYY$;BR18;BU6;S4;X
SS$;BD12;BR6;S6;XO$;BR8;BD2;XL$;
BR11;BD9;S7;XDD$;BD2;BR3;XII$;BR
9;BD6;S6;XE$;BR9;BD2;XR$;BR4;BD4
;S8;XS$;"
700 HDRAW"S8;BM116,161;XA1$;XA2$
;"
710 HPAINT(116,164),8,8
720 HPAINT(112,166),3,8
730 HPAINT(112,102),3,8
740 HPAINT(94,102),3,8
750 HPAINT(87,102),3,8
760 HPAINT(124,98),3,8
770 HPAINT(128,98),8,8
780 HPAINT(132,98),3,8
790 HPAINT(112,70),3,8
800 HPAINT(112,50),3,8
810 HPAINT(112,55),3,8
820 HPAINT(112,108),1,8
830 PALETTE 4,54
840 HPAINT(110,60),4,8
850 HPAINT(86,114),4,8
860 HPAINT(133,114),4,8
870 '
880 HDRAW"BM174,174;XA1$;XA2$;
890 HPAINT(174,178),8,8
900 HPAINT(170,179),3,8
910 HPAINT(168,114),3,8
920 HPAINT(154,110),3,8
930 HPAINT(148,110),3,8
940 HPAINT(182,110),3,8
950 HPAINT(186,110),8,8
960 HPAINT(190,110),3,8
970 HPAINT(170,86),3,8
980 HPAINT(160,60),3,8
```

```
990 HPAINT(166,68),3,8
1000 HPAINT(166,108),1,8
1010 PALETTE 4,54
1020 HPAINT(174,76),4,8
1030 HPAINT(146,126),4,8
1040 HPAINT(192,126),4,8
1050 '
1060 HDRAW"BM232,156;XA1$;XA2$;
1070 HPAINT(228,164),8,8
1080 HPAINT(228,161),3,8
1090 HPAINT(224,95),3,8
1100 HPAINT(204,91),3,8
1110 HPAINT(210,91),3,8
1120 HPAINT(236,86),3,8
1130 HPAINT(244,86),8,8
1140 HPAINT(248,86),3,8
1150 HPAINT(232,65),3,8
1160 HPAINT(228,40),3,8
1170 HPAINT(228,50),3,8
1180 HPAINT(228,90),1,8
1190 PALETTE 4,54
1200 HPAINT(228,57),4,8
1210 HPAINT(206,107),4,8
1220 HPAINT(251,107),4,8
1230 '
1240 HDRAW"BM56,152;XA1$;XA2$;
1250 HPAINT(50,160),8,8
1260 HPAINT(46,157),3,8
1270 HPAINT(48,92),3,8
1280 HPAINT(30,89),3,8
1290 HPAINT(34,89),3,8
1300 HPAINT(65,84),3,8
1310 HPAINT(67,84),8,8
1320 HPAINT(72,84),3,8
1330 HPAINT(46,64),3,8
1340 HPAINT(46,40),3,8
1350 HPAINT(46,46),3,8
1360 HPAINT(46,80),1,8
1370 PALETTE 4,54
1380 HPAINT(46,50),4,8
1390 HPAINT(25,105),4,8
1400 HPAINT(74,105),4,8
1410 '
1420 HDRAW"BM290,148;XA1$;XA2$;
1430 HPAINT(290,156),8,8
1440 HPAINT(284,153),3,8
1450 HPAINT(282,90),3,8
1460 HPAINT(262,90),3,8
1470 HPAINT(268,86),3,8
1480 HPAINT(296,80),3,8
1490 HPAINT(302,80),8,8
1500 HPAINT(305,80),3,8
1510 HPAINT(284,60),3,8
1520 HPAINT(284,30),3,8
1530 HPAINT(280,42),3,8
1540 HPAINT(280,82),1,8
1550 PALETTE 4,54
```

```
1560 HPAINT(290,50),4,8
1570 HPAINT(260,100),4,8
1580 HPAINT(308,100),4,8
1590 FOR D=1 TO 500:NEXT D
1600 PLAY"T2V30O2;L8BBBBAAL4A;L8
GGGGL2B"
1610 PALETTE 0,21
1620 PLAY"L8EEEEDDL4G;L8F#GABL2A
"
1630 PALETTE 0,37
1640 PLAY"L8BBBBAAL4A;L8GGGGL2B"
1650 PALETTE 0,53
1660 PLAY"L8EEEEDDL4G;L8AGABL2G"
1670 PALETTE 0,5
1680 FOR D=1 TO 500:NEXT D
1690 '
1700 '***** ANGELS SING ********
1710 GOSUB2560
1720 HSCREEN2:PALETTE 0,29:HCLS0
:PALETTE 8,63
1730 HPRINT(12,12),"HARK THE HER
ALD"
1740 FOR D=1 TO 500:NEXT D
1750 B$="XAA$;BR4;XN$;BU1;BR9;XG
$;BU4;BR14;XE$;BR8;BD3;XL$;BR6;B
D7;XS$;"
1760 C$="S6;XSS$;BR4;BD10;S8;XI$
;BR7;BD8;XN$;BR9;BU1;XG$;"
1770 HCOLOR 8
1780 HDRAW"S8;BM70,40;"+B$
1790 HDRAW"BM190,36;"+C$
1800 FOR D=1 TO 500:NEXT D
1810 HPAINT(0,96),0,4
1820 FOR X=2 TO 320 STEP 10
1830 HCIRCLE(X,8),4,8
1840 HCIRCLE(X,184),4,8
1850 NEXT X
1860 HPAINT(0,96),0,4
1870 AN$="R3E2R3E2R3E2R4;E2R4U4H
3U1H3U1H3U1H3U1H3;E2U1R2E2U1R2U2
;H2L2;E2U1R2E2U1R2U2;H2L2;E2U1R2
E2U1R2U2;H2L2;E2U1R2U2;H2L2;D1L2
D1L2D1L2D1L2D1L2D1L2D1L2D1L2H2;E
2U1E2U1L2E2U1H3U1L2H1L1;"
1880 AG$="L3H2L3H2L3H2L4;H2L4U4E
3U1E3U1E3U1E3U1E3;H2U1L2H2U1L2U2
;E2R2;H2U1L2H2U1L2U2;E2R2;H2U1L2
H2U1L2U2;E2R2;H2U1L2U2;E2R2;D1R2
D1R2D1R2D1R2D1R2D1R2D1R2D1R2E2;H
2U1H2U1R2H2U1E3U1R2E1R2;"
1890 PALETTE 8,63:HCOLOR 8
1900 HDRAW"BM160,140;S4;XAN$;"
1910 HDRAW"BM160,140;XAG$;"
1920 HPAINT(158,120),8,8
1930 HDRAW"BM94,140;XAN$;"
1940 HDRAW"BM94,140;XAG$;"
1950 HPAINT(94,120),8,8
1960 HDRAW"BM226,140;XAN$;"
1970 HDRAW"BM226,140;XAG$;"
1980 HPAINT(226,120),8,8
1990 FOR D=1 TO 500:NEXT D
2000 PALETTE 0,29
2010 PALETTE 8,63
2020 HCOLOR 8
2030 HPRINT(4,20),"IT CAME UPON
THE MIDNIGHT CLEAR,
2040 PLAY"T2;V25;O2L8GO3L4EL8DDC
O2AL4GL8AL4G"
2050 HPAINT(0,160),0,4
2060 HPRINT(7,20),"THAT GLORIOUS
 SONG OF OLD,"
2070 PLAY"L8GABO3CCDEL3D"
2080 HPAINT(0,160),0,4
2090 HPRINT(3,20),"FROM ANGELS B
ENDING NEAR THE EARTH,"
2100 PLAY"O2L8GO3L4EO2L8BO3L8DCO
2AL4GL8AL4G"
2110 HPAINT(0,160),0,4
2120 HPRINT(6,20),"TO TOUCH THEI
R HARPS OF GOLD,"
2130 PLAY"L8GL4AL8ABAGO3L3C"
2140 HPAINT(0,160),0,4
2150 HPRINT(3,20),"PEACE ON THE
EARTH, GOODWILL TO MEN"
```

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```
2160 PLAY"L8EL4EO2L8EEF#G#L4AL8B
O3L4C"
2170 HPAINT(0,160),0,4
2180 HPRINT(5,20),"FROM HEAV'N'S
 ALL GRACIOUS KING."
2190 PLAY"L8EDCO2BABAL3G"
2200 HPAINT(4,160),0,4
2210 HPRINT(4,20),"THE WORLD IN
SOLEMN STILLNESS LAY"
2220 PLAY"L8GO3L4EO2L8BO3DCO2AL4
GL8AL4G"
2230 HPAINT(0,160),0,4
2240 HPRINT(8,20),"TO HEAR THE A
NGELS SING."
2250 PLAY"L8GL4AL8ABAGO3L3C"
2260 HPAINT(0,160),0,4
2270 PALETTE 0,27:FOR D=1TO500:N
EXT D
2280 PALETTE 0,26:FOR D=1 TO 500
:NEXT D
2290 PALETTE 0,25:FOR D=1 TO 500
:NEXT D
2300 PALETTE 0,7:FOR D=1 TO 500:
NEXT D
2310 '
2320 '    MERRY CHRISTMAS
       AND HAPPY NEW YEAR
2330 GOSUB2550
2340 HSCREEN2:PALETTE0,7:PALETTE
8,63
2350 HCOLOR 8
2360 HDRAW"BM46,42;S8;XX1$;"
2370 GOSUB2940
2380 HDRAW"BM150,28;XX2$;"
2390 GOSUB2940
2400 HDRAW"BM132,86;XA$;BR3;BD1;
XN$;BR7;XD$;"
2410 GOSUB2940
2420 HDRAW"BM46,150;XHH$;BR3;BU5
;XA$;BR3;BD4;XP$;BR7;BD4;XP$;BR7
;BU5;XYY$;"
2430 GOSUB2940
2440 HDRAW"BR16;BU2;XNN$;BR8;BU1
;XE$;BR8;BD3;XW$;"
2450 GOSUB2940
2460 HDRAW"BR10;BU2;XZY$;BR8;BD6
;BD1;XE$;BR9;BU2;XA$;BR3;XR$;"
2470 PLAY"T3;V30;O2L4FB-L8B-O3CO
2B-AL4GGGO3CL8CDCO2B-O2L4AFFO3DL
8DE-DCO2L4B-GL8FFL4GO3CO2AL2B-"
2480 GOSUB2940
2490 PALETTE 0,18:PALETTE 8,63:H
COLOR 8
2500 HDRAW"BM278,182;S4;XRR$;BR1
0;XEE$;BR16;BU3;XGG$;"
2510 PLAY"O2L4FB-B-B-L2AL4AB-AGL
2FO3L4CDL8CCO2B-B-O3L4FO2L4FL8FF
L4GO3CO2AL2B-"
2520 PALETTE 0,23:FOR D=1 TO 500
:NEXT D
2530 PALETTE 0,7
2540 GOTO2540
2550 '*******ALPHABET***********
2560 AA$="U6E3R1F3D3NL6D3"
2570 A$="E1R2F1D5L3H1U1E1R3BD3R1
E1"
2580 B$="U8D4R5F1D2G1L5"
2590 CC$="H1L4G1D6F1R4E1"
2600 D$="U6D4H1L2G1D1F1R4E1"
2610 DD$="U6D4H1L2G1D2F1R4E1"
2620 EE$="L5H1U6E1R5BD4BL1L4"
2630 E$="G1L3H1U4E1R3F1D2L5"
2640 GG$="H1L4G1D6F1R4E1U2L3"
2650 G$="G1L3H1U4E1R3F1D8G1L3H1"
2660 HH$="U8D4E1F1R2E1F1U4D8"
2670 H$="U8D4E1R3F1D4"
2680 I$="R4L2U6L2R4BL2BU3D"
2690 II$="R2L1U5L2R3BL2BU2U"
2700 L$="R3L1U8L2"
2710 MM$="U8F2R1D1U1R1E2D8"
2720 M$="D5U6R2F1D5U5E1R1F1D5"
2730 NN$="U8D1F5E1U5D8"
2740 N$="U6F1E1R2F1D5"
2750 OO$="U4E1R3F1D4G1L3H1"
2760 O$="U4R4D4L4"
2770 PP$="U8E1R4F1D3G1L4"
2780 P$="U9D1E1R2F1D3G1L3"
2790 RR$="U7E1R4F1D2G1L4R1F4"
2800 R$="U6D1F1E1R1F1"
2810 SS$="F2R3E2U2H2L3H2U2E2R3F2
"
2820 S$="F1R2E1U1H1L2H1U1E1R2F1"
2830 TT$="U8NL3R3"
2840 T$="G1L1U8D2L3R6"
2850 U$="U5;BD5;F1;R3;E1;U5"
2860 W$="BU6D5F1R1E1U5D5F1R1E1U5
"
2870 YY$="D4F1R3E1U4D8G1L3H1"
2880 ZY$="D2F2R2D4U4R2E2U2"
2890 Y$="D2F1R4U3D5G1L3H1"
2900 X1$="XMM$;BR8;BU1;XE$;BR8;B
D3;XR$;BD4;BR2;XR$;BD4;BR2;BU6;X
Y$;" 'MERRY
2910 X2$="XCC$;BR3;BD1;XH$;BR3;X
R$;BD4;BR2;XI$;BR2;BD7;BR3;XS$;B
R7;BD4;XT$;BR3;BD1;XM$;BR4;BU5;X
A$;BR3;XS$;" 'CHRISTMAS
2920 X3$="XPP$;BD2;BR8;XOO$;BR12
;XT$;BD9;BR3;XP$;BR7;XOO$;BR4;BR
4;XU$;BD6;BR3;XR$;BD4;BR3;XR$;BD
4;BR2;XI$;" 'POTPOURRI
2930 RETURN
2940 FOR D=1 TO 200:NEXT D
2950 RETURN
2960 PALETTE CMP:HSCREEN 0:WIDTH
32:CLS
```

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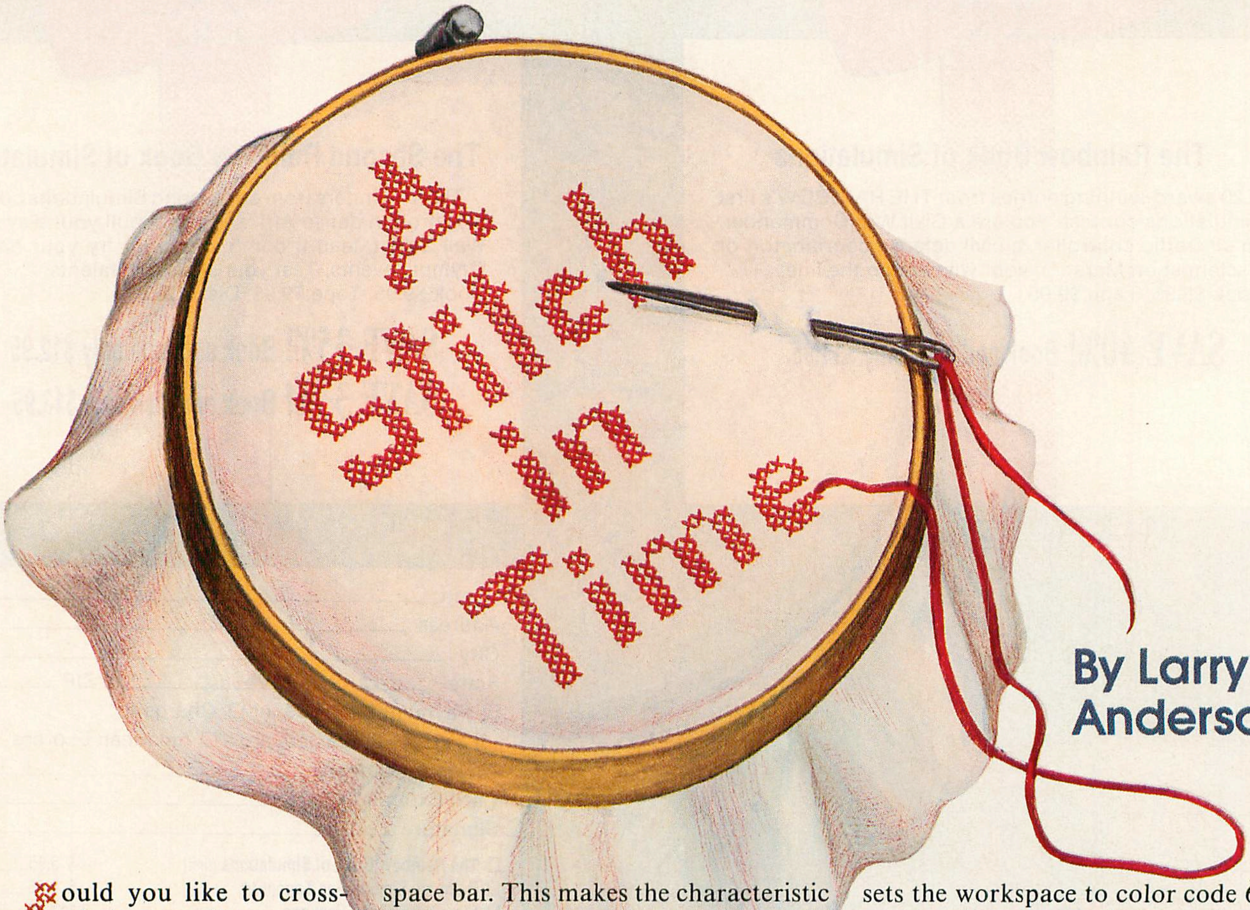


A Stitch in Time

By Larry Anderson

Would you like to cross-stitch, even if you can't thread a needle? With *Counted Cross-Stitch,* you can simulate cross-stitchery in your choice of 15 different colors. It's your creative doodler with a flair.

For the dedicated craftsperson, new ideas for cross-stitch designs can be tried, altered, assigned different colors, and, if desired, photographed on the monitor screen. (I am leaving it to a more ambitious programmer to create a 16-color graphics dump to capture the graphics on paper.)

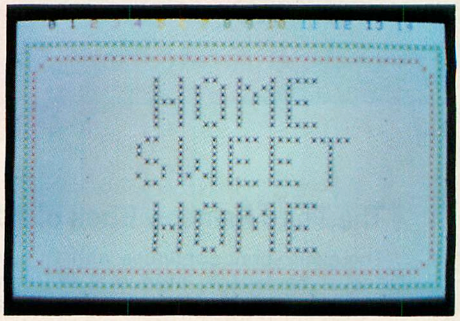
Here's how it works. The CoCo 3 is put into the 16-color graphics mode, and a help screen is displayed. Pressing any key advances you to the work area, with its grid of reference dots and overhead color chart. Your cursor is the small dot in the middle of the screen (you can see it better by moving it with the arrow keys). Position it where you will begin to "stitch," and press the space bar. This makes the characteristic X-shaped stitch in the default color, black. Other colors are also available at any time. Simply type `C` followed by a number between 0 and 14, and you will see the cursor change to the color of your choice. Move around the screen and try a few stitches.

Want to move in larger jumps? Just hold down the ALT key when you use the arrow keys. Your moves will be 10 times greater, allowing you to get around the screen in a hurry. Do you want to erase the stitch you just made? Type `D` and it will be gone. Any other stitch can be removed by moving the cursor over it, pressing the space bar and typing `D`.

When you tire of one design and want to move on to another one, pressing the ESC/BREAK key gives you the choice of erasing or quitting. Erasing lets you start fresh, while quitting lets you exit to BASIC.

Here's the program's structure. Line 30 sets the 16-color Hi-Res graphic mode, and lines 40 through 80 establish the help screen. Line 90 sets initial foreground and background colors and cursor position. Then the palette is reloaded with different color assignments (you are welcome to change these codes, which are in Line 390 as data). Line 130 sets the workspace to color code 63 for a neutral background. Then lines 140 through 170 print the color chart and a grid of dots for reference.

Foreground and background colors are initialized to 0 and 15 (remember Line 90?) and the cursor is placed on the screen in lines 180 and 190. Line 200 looks for a keystroke and blanks out the cursor dot when it sees a key pressed. The cursor will move a standard displacement unless the ALT key is also pressed, in which case the displacement increases tenfold — see lines 210 through 250. If the `C` is typed, lines 340 and 380 assign the foreground color by your next (numeric) keystrokes. If `D` is selected, lines 320 and 330 cause the stitch to be redrawn in the background color, making it invisible, and effectively erasing it.



Larry Anderson is an auto mechanic and electronics instructor who lives in Benton, Louisiana, with his wife, Linda, and their 13-year-old daughter, Kacy. He holds a degree in English, and his interests include photography and cooking.

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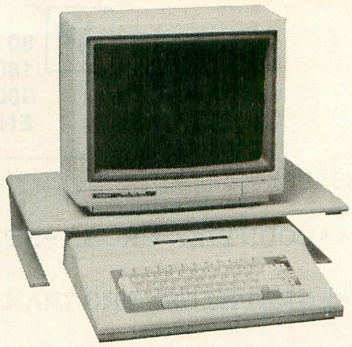

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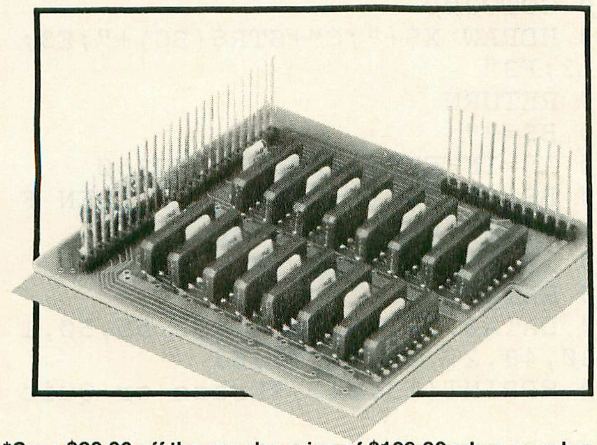

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Line 270 relocates the cursor according to the foregoing (note that it is offset by one dot to avoid changing an X that you may move it through). If you press the space bar, an X-shaped character is drawn by lines 280 through 300 in the specified foreground color.

Now let's get busy cross-stitching!

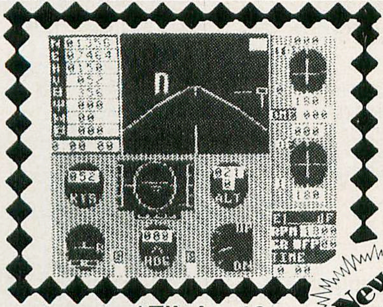
(Questions may be directed to the author at 202 Jackson St., Benton, LA 71006. Please enclose an SASE when requesting a reply.) □

80	212
180	233
300	139
END	232

The listing: XSTITCH

```
1 '*****COUNTED CROSS-STITCH****
*
2 '*****GRAPHICS PROGRAM FOR****
*
3 '*********THE COCO 3 *********
*
4 '******BY LARRY ANDERSON******
*
5 '********PO BOX 180 **********
*
6 '******BENTON, LA 71006*******
*
7 '******COPYRIGHT 1987********
*
8 '
9 '
10 '
20 ONBRK GOTO 400
30 HSCREEN2
40 HCLS5
50 HPRINT(11,10),"COUNTED CROSS-
STITCH"
60 HPRINT(4,12),"Space bar marks
 the stitch":HPRINT(4,13),"Arrow
 keys move the cursor dot":HPRIN
T(4,14),"ALT-arrow multiplies cu
rsor movement"
70 HPRINT(4,15),"C and 2 digits
sets stitch color":HPRINT(4,16),
"D deletes the current stitch":H
PRINT(4,18),"(delete any stitch
by moving to it,":HPRINT(4,19),"
 press SPACEBAR and then D)"
80 A$=INKEY$:IFA$="" THEN80
90 FG=0:BG=15:X=162:Y=90
100 FOR SL=0TO15:READ CL:PALETTE
 SL,CL
110 NEXT SL
120 RESTORE
130 HCLS15
140 HCOLOR 0,15:HPRINT(3,0),"0":
HCOLOR 1,15:HPRINT(5,0),"1":HCOL
OR 2,15:HPRINT(7,0),"2":HCOLOR3,
15:HPRINT(9,0),"3":HCOLOR4,15:HP
RINT(11,0),"4"
150 HCOLOR5,15:HPRINT(13,0),"5":
HCOLOR6,15:HPRINT(15,0),"6":HCOL
OR7,15:HPRINT(17,0),"7":HCOLOR8,
15:HPRINT(19,0),"8":HCOLOR9,15:H
PRINT(21,0),"9"
160 HCOLOR10,15:HPRINT(23,0),"10
":HCOLOR11,15:HPRINT(26,0),"11":
HCOLOR12,15:HPRINT(29,0),"12":HC
OLOR13,15:HPRINT(32,0),"13":HCOL
OR14,15:HPRINT(35,0),"14"
170 FOR L=1TO320STEP54:FOR M=30T
O190STEP40:HSET(L,M,0):HSET(319,
M,0):NEXT M,L
180 HCOLOR FG,BG
190 HSET(X+1,Y,FG)
200 A$=INKEY$:IFA$=""THEN200 ELS
E HRESET(X+1,Y)
210 D=6:E=5
220 IFPEEK(341)=191 OR PEEK(341)
=183  THEN E=40:D=54
230 IF ASC(A$)=8 THEN X=X-D ELSE
IF ASC(A$)=9 THEN X=X+D ELSEIF A
SC(A$)=10 THEN Y=Y+E ELSEIF ASC(
A$)=94 THEN Y=Y-E
240 IFX<0THEN X=0 ELSE IF X>318
THEN X=318
250 IFY<0THEN Y=0 ELSE IF Y>190T
HEN Y=190
260 IFA$="C"THEN GOSUB340:ELSEIF
A$="D" THENGOSUB320
270 HSET(X+1,Y,FG)ELSEGOTO200
280 IFA$=CHR$(32)THEN 290ELSE 20
0
290 X$="BM"+STR$(X)+","+STR$(Y)+
";"
300 HDRAW X$+";C"+STR$(FG)+";E3;
B;L3;F3"
310 GOTO200
320 HDRAW X$+";C"+STR$(BG)+";E3;
B;L3;F3"
330 RETURN
340 B$=""
350 A$=INKEY$:IFA$=""THEN350
360 B$=B$+A$:IF LEN(B$)=2 THEN F
G=VAL(B$) ELSE GOTO350
370 IF FG>15 THEN FG=0
380 RETURN
390 DATA0,32,39,60,47,52,55,50,1
6,20,48,27,29,10,57,63
400 HPRINT(13,24),"Erase or Quit
?"
410 A$=INKEY$:IFA$=""THEN410
420 IFA$="Q"THEN PALETTE RGB:NEW
:ELSEGOTO90
430 A$=INKEY$:IFA$=""THEN430ELSE
PRINTASC(A$);:PRINTPEEK(341)::GO
TO430
```

TOM MIX'S MINI-CATALOG



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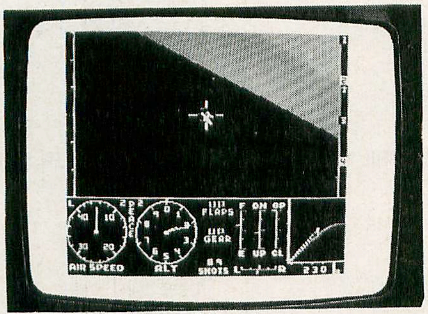

*P-51 Mustang Attack/Flight Simulation

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32K Machine Language

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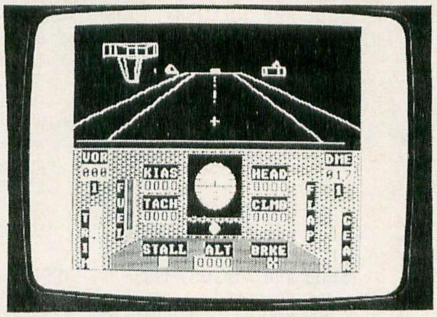

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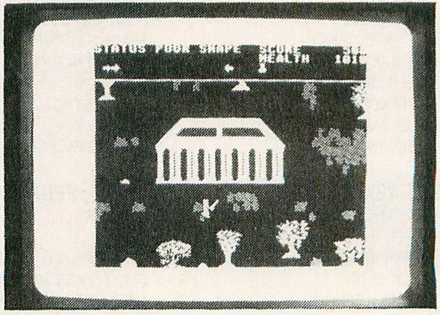

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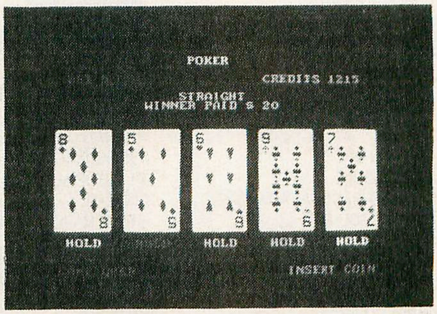

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COVER 1
RACETRACK
HANGMAN
MUSIC ALBUM
LIFE EXPECTANCY
WORD TESTS
KILLER MANSION
BARTENDER
CALENDAR
ROBOT WAR

ISSUE #2, AUGUST 1982
UFO COVER PT. 1
BIORHYTHM
BOMBARDMENT
BLACK JACK
COST OF LIVING
FRENZY
BUSINESS LETTER
QUICK THINK
QUEST INSTRUCTIONS
QUEST FOR LENORE

ISSUE #3, SEPTEMBER 1982
UFO COVER PT. 2
BASKETBALL
CHUCKLUCK
SLOT MACHINE
ALPHABETIZER
NFL PREDICTIONS
FLAG CAPTURE
ROBOT BOMBER

ISSUE #4, OCTOBER 1982
UFO RESCUE
TANK BATTLE
DRIVEWAY
SOUNDS
BALLOON DROP
MIND BOGGLE
COCO-TERRESTRIAL ADV.
CALORIE COUNTER
JACK-O-LANTERN

ISSUE #5, NOVEMBER 1982
CATALOG COVER
BOWLING
PROGRAM INVENTORY
PROMISSORY-LOANS
CHECKBOOK BALANCER
TRIGONOMETRY TUTOR
CONVOY
BAG-IT
SPECTRA SOUND
CONVEYOR BELT

ISSUE #6, DECEMBER 1982
CHRISTMAS COVER
RAINDROPS
STOCK MARKET
ADVANCED PONG
DESTROY
SOUND ANALYZER
CREATIVITY TEST
VOICE DATA
ML TUTORIAL PT. 1
LOONY LANDER

ISSUE #7, JANUARY 1983
NEW YEARS COVER
LIST ENHANCER
SUPER PRECISION DIV.
BOMB DIFFUSE
SPACE STATION
ML TUTORIAL PT. 2
SHOOT OUT
FIND UTILITY
CYBORG INS.
CYBORG FACES

ISSUE #8, FEBRUARY 1983
COVER 8
DEFEND
3 DIMENSIONAL MAZE
COCO CONCENTRATION
AUTO LINE NUMBERING
ML TUTORIAL PT. 3A
ML TUTORIAL PT. 3B
NUCLEAR POWER PLANT
DUAL BARRIER
BRICKS

ISSUE #9, MARCH 1983
TIME MACHINE COVER
TRIG DEMO
PYRAMID OF CHEOPS
PROGRAM PACKER
BUDGET
ELECTRONIC DATEBOOK
ML TUTORIAL PT. 4
TAPE DIRECTORY
BLOCK-STIR
COCO ADDING MACHINE

ISSUE #10, APRIL 1983
TENTH COVER
PYRAMID OF DANGER
TYPING TUTOR
ML TUTORIAL PT. 5
TINYCALC
STOCK MARKET COMP
YAH-HOO
MISSILE ATTACK
SCREEN PRINT
BRIKPONG

ISSUE #11, MAY 1983
ELEVENTH COVER
ARCHERY
FROG JUMP
ML TUTORIAL PT. 6
MLT DICTIONARY
BASIC SPEED UP TOT.
METRIC CONVERTOR
GRAPHIC QUAD ANTENNA
GRAPHICS PROGRAM
CATERPILLAR CAVE

ISSUE #12, JUNE 1983
TWELFTH COVER
SHOOTING GALLERY
BOMB STOPPER
VALLEY BOMBER
STARFIGHTER
WHEEL OF FORTUNE
ML TUTORIAL PT. 7
MERGE UTILITY
RAM TEST
LANDER

ISSUE #13, JULY 1983
THIRTEENTH COVER
FLASH CARD
ICE BLOCK
COSMIC FORTRESS
MAIL LIST
DOLLARS & CENTS
ML TUTORIAL PT. 8
SDSK COPY
MUSIC SYNTHESIZER
CRAWLER

ISSUE #14, AUGUST 1983
MYSTERY COVER
ROW BOAT
COMPUTER TUTL PT. 1
INDEX DATABASE
DISK ZAPPER
COCO-MONITOR
COCO-ARTIST
ROBOT COMMAND
TEST SCREEN PRINT
HIGH RESOLUTION TEXT

ISSUE #15, SEPTEMBER 1983
MYSTERY COVER PT. 2
GOLD VALUES
TREK INSTRUCTIONS
TREK
HIGH TEXT MODIFICATION
ASTRO DODGE
DR. COCO
PEG JUMP
MORSE CODE
PURGE UTILITY

ISSUE #16, OCTOBER 1983
MYSTERY COVER
BOPOTRON
DIRECTORY RECALL
VECTOR GRAPHICS INST.
VECTOR GRAPHICS
SKYDIVER
SWERVE AND DODGE
NIMBO BATTLE
TAPE ANALYSIS UTILITY
LIFE GENERATIONS

ISSUE #17, NOVEMBER 1983
THANKSGIVING COVER
3-D TIC-TAC-TOE
INDY 500
COLLEGE ADVENTURE
MEMORY GAME
DUNGEON MASTER
WEATHER FORECASTER
GRID FACTOR INST.
GRID FACTOR
DRAW

ISSUE #18, DECEMBER 1983
CHRISTMAS COVER
CLIMBER
GALACTIC CONQUEST
WARLORDS
STATES REVIEW
MATH TUTOR
MACHINE LANGUAGE DATA
PRINTER UTILITY INST.
PRINTER UTILITY
MUTANT WAFFLES

ISSUE #19, JANUARY 1984
BANNER
PROBE
DISK DIRECTORY PROTECTOR
OPTICAL CONFUSION
WORD PROCESSOR
WORD SEARCH
ASTRONAUT RESCUE
STAR TRAP
PIE CHART
FORCE FIELD

ISSUE #20, FEBRUARY 1984
INTRODUCTION:
HINTS FOR YOUR COCO
ESCAPE ADVENTURE
SEEKERS
MASTER BRAIN
LIST CONTROLLER
DISKETTE CERTIFIER
ROM COPY
BASIC RAM
SNAFUS

ISSUE #21, MARCH 1984
BASIC CONVERSIONS
FINANCIAL ADVISE
CASTLE STORM
DOS HEAD CLEANER
COCO TERMINAL
SNAKE CRAWLER
WAR CASTLE
SKY FIRE
EASY BASIC
DOTS 3-D

ISSUE #22, APRIL 1984
HEALTH HINTS
GLIBLIBS
CLOTHER SLITHER
BIBLE 1 & 2
BIBLE 3 & 4
CATCH ALL
INVADER
ALIEN RAID
MOON ROVER
IO ERROR IGNORER

ISSUE #23, MAY 1984
MONEY SAVERS 1 & 2
STOCKS OR BOMBS
WALL AROUND
COCO TECHNICAL LOOK PT. 1
NUCLEAR WAR INST.
THERMONUCLEAR WAR
CIRCUIT DRAWER
MOUSE RACES
SUPER-SQUEEZE
DATA FALL

ISSUE #24, JUNE 1984
DIR PACK & SORT
BRICK OUT
COCO TECHNICAL LOOK PT. 2
USA SLIDE PUZZLE
51 *24 SCREEN EDITOR
51 *24 SCREEN
CITY INVADERS
PRINTER SPOOLER
STEPS
SNAKE

ISSUE #25, JULY 1984
CLOCK
COCO TECHNICAL LOOK PT. 3
SKID ROW ADVENTURE
MONEY MAKER
PIN-HEAD CLEANING
LINE EDITOR INST.
LINE EDITOR
BOOMERANG
BUBBLE BUSTER
RECOCHET

ISSUE #26, AUGUST 1984
PEEK, POLE & EXECUTE
SAUCER RESCUE
YOUNG TYPER TUTOR
O-TEL-O
OLYMPIC EVENTS
DOUBLE DICE
COCO DATABASE
BATTLE STAR
COCO-PIN BALL
MONTEZUMAS DUNGEONS

ISSUE #27, SEPTEMBER 1984
COCO TO COM 64
GALACTIC SMUGGLER
INDY RACE
ACCOUNT MANAGER
CASSETTE MERGE UTILITY
STRING PACKING TUTORIAL
SPACE DUEL
BUGS
TRAP-BALL
BALLOON FIRE

ISSUE #28, OCTOBER 1984
HANGING TREE
CHECKERS
FOOTBALL +
MORE PEEKS, POKES
SPELLING CHECKER
SOUND DEVELOPMENT
WORD GAME
SCREEN REVERSE
AUTO COPY
RAT ATTACK

ISSUE #29, NOVEMBER 1984
DISK ROLL OUT
ROBOT ON
MULTIPONG
ADVENTURE GENERATOR
QUEST ADVENTURE
QUARTER BOUNCE
DUAL OUTPUT
KEY REPEAT
FULL EDITOR
METEOR

ISSUE #30, DECEMBER 1984
MATH HELP
ZECTOR ADVENTURE
WORLD CONQUEST
DRAG RACE
MINE FIELD
T-NOTES TUTORIAL
T & D PROGRAM INDEXER
SYSTEM STATUS
ERROR TRAP
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TREASURES OF BARSOOM
BATTLE GROUND
STRUCTURED COMPILED LANGUAGE
LIBRARY MODULE
MINIATURE GOLF
STAR DUEL
ARITHMETIC FOOTBALL
GRID RUN
SPIRAL ATTACK
FAST SORT
MUNCHMAN

ISSUE #32, FEBRUARY 1985
DR. SIGMUND
ICE WORLD ADVENTURE
LOTTERY ANALYST
BASIC COMPILER
MUSIC CREATOR
MEANIE PATROL
TRI-COLOR CARDS
SHAPE RECOGNITION
DISK BACKUP
SPACE PROTECTOR

ISSUE #33, MARCH 1985
LIGHT CYCLE
PAINT
SKEET SHOOTING
GUITAR NOTES
ML DISK ANALYZER
PERSONAL DIRECTORY
NAUGHA ADVENTURE
EGGS GAME
DISK DIRECTORY PRINT
SPEED KEY

ISSUE #34, APRIL 1985
HOVER TANK
POWER SWORD
TERMITE INVASION
SPELLING CHECKER
DOS BOSS
NINE CARD CHOICE
MUSIC GENERATOR
FYR-DRACA
DRIVE TEST
GRAPHIC TOUR

ISSUE #35, MAY 1985
SELECT A GAME 1
TAPE PROBLEMS
STROLL TRIVIA
SOFTBALL MANAGER
FONTS DEMO
CLOWN DUNK MATH
ALPHA MISSION
DOS ENHANCER
HAUNTED HOUSE

ISSUE #36, JUNE 1985
SELECT A GAME 2
VIDEO COMPUTIZER
SPEECH SYNTHESIS
SPEECH RECOGNITION
SPACE LAB
AUTO COMMAND
COMPUTER MATCHMAKER
KNIGHT AND THE LABYRINTH
STAR SIEGE
TALKING SPELLING QUIZ

ISSUE #37, JULY 1985
CHESS MASTER
BIBLE 5–7
SHIP WREK ADVENTURE
FILE TRANSFER
FOUR IN A ROW
MARSHY
TAPE CONTROLLER
CATACOMB
AUTO TALK
SGR8PAK

ISSUE #38, AUGUST 1985
GOLF PAR 3
WIZARD ADVENTURE
KITE DESIGN
ROBOTS
GOMOKU
AMULET OF POWER
LINE COPY UTILITY
DISK PLUMBER
SUPER RAM CHECKER
GRAPHIC HORSE RACE

ISSUE #39, SEPTEMBER 1985
DRUNK DRIVING
CAR MANAGER
SQUEEZE PLAY
SUPER BACKUP
RECIPE MACHINE
ANTI-AIRCRAFT
UNREASON ADVENTURE
TALKING ALPHABET
SUPER VADERS
AUTOMATIC EDITOR

ISSUE #40, OCTOBER 1985
STAR TREK
HAM RADIO LOG
COCO-WAR
DISK LABELER
SHIP WAR
ELECTRIC COST
MULTIKEY BUFFER
NUKE AVENGER
CURSOR KING
SAND ROVER

ISSUE #41, NOVEMBER 1985
GRUMPS
DISK DRIVE SPEED TEST
SOLAR CONQUEST
GAS COST
RIME WORLD MISSION
WUMPUS
CHARACTER EDITOR
GRAPHIC TEST
GRAPHIC LOOPY
BOLD PRINT

ISSUE #42, DECEMBER 1985
HOME PRODUCT EVALUATION
YAHTZEE
DISK UTILITY
MACH II
ELECTRONIC BILLBOARD
CAR CHASE
SUPER MANSION ADVENTURE
SLOT MACHINE GIVE AWAY
TEXT BUFFER
TUNNEL RUN

ISSUE #43, JANUARY 1986
DUELING CANNONS
WATER COST
ZIGMA EXPERIMENT
MUSICAL CHORDS
SAFE PASSAGE
PASSWORD SCRAMBLER
GUNFIGHT
KEYPAD ENTRY
STYX GAME
PRINTER DIVERT

ISSUE #44, FEBRUARY 1986
HOME INVENTORY
NINE BALL
PRINTER REVIEW
EXPLORER ADVENTURE
SPANISH LESSONS
CROSS FIRE
RAM SAVER
GRAY LADY
JOYSTICK INPUT
COSMIC SWEEPER

ISSUE #45, MARCH 1986
INCOME PROPERTY MGMT.
ELECTRONIC BILLBOARD 2
MOUNTAIN BATTLE
THE FIGHT
COLO KEENO
HOCKEY
LOGICAL PATTERNS
ON SCALE SCREEN
LIBERTY SHIP
SINGLE STEP RUN

ISSUE #46, APRIL 1986
SPECIAL EVENTS REMINDER
DISK LOCK
SMALL BUSINESS MANAGER
BOMB RUN
TANKS
TAR PITS
BASEBALL
NUMBER RELATIONSHIPS
ROULETTE
GLOBAL EDITOR

ISSUE #47, MAY 1986
CHRISTMAS LIST
BLACK HOLE
PITCHING MANAGER
SYMBOLIC DIFF.
BUG SPRAY
OWARE CAPTURE
EASY GRAPHICS
DESERT JOURNEY
SCREEN CONTROL
FULL ERROR MESSAGE

ISSUE #48, JUNE 1986
CHESTER
TV SCHEDULE
BASE RACE
ROMAN NUMERALS
ASTRO DODGE
HIRED AND FIRED
MULTI COPY
AUTO MATE
SCROLL PROTECT
NOISE GENERATOR

ISSUE #49, JULY 1986
COMPUTER I.O.U.
DISK DISASSEMBLER
BAKCHEK
PACHINKO
STOCK CHARTING
HAUNTED STAIRCASE
CANYON BOMBERS
DRAGONS 1 & 2
GRAPHIC SCROLL ROUTINE
AUTO BORDER

ISSUE #50, AUGUST 1986
BUSINESS INVENTORY
D & D ARENA
DISK CLERK
PC SURVEY
TREASURE HUNT
SCREEN GENERATOR
ASTRO SMASH
NFL SCORES
BARN STORMING
SMASH GAME

ISSUE #51, SEPTEMBER 1986
ASSET MANAGER
MONEY CHASE
FISHING CONTEST
RIP OFF
HAND OFF
BUDGET 51
VAN GAR
DOS EMULATOR
MEM DISK
VARIABLE REFERENCE

ISSUE #52, OCTOBER 1986
ACCOUNTS RECEIVABLE
WORKMATE SERIES
CALENDAR
INVASION
THE TRIP ADVENTURE
FOOT RACE
FLIPPY THE SEAL
SCREEN CALCULATOR
ABLE BUILDERS
SUPER ERROR 2

ISSUE #53, NOVEMBER 1986
CORE KILL
LUCKY MONEY
COOKIES ADVENTURE
NICE LIST
SPANISH QUIZZES
PAINT EDITOR
CAVERN CRUISER
SNAP SHOT
MEGA RACE
KICK GUY

ISSUE #54, DECEMBER 1986
JOB LOG
PEGS
DIGITAL SAMPLING
JUNGLE ADVENTURE
PAINT COCO 3
CONVERT 3
COMPUTER TYPE
PANZER TANKS
MRS PAC
BIG NUM

ISSUE #55, JANUARY 1987
GRADE BOOK
MAIL LIST
DOWN HILL
FIRE FOX
JETS CONTROL
GALLOWS
DIR MANAGER
FIRE RUNNER
GRAPHICS BORDER
COSMIC RAYS

ISSUE #56, FEBRUARY 1987
CALENDAR PRINT
CRUSH
GALACTA
OCEAN DIVER
CLUE SUSPECT
WORD EDITOR
ALIEN HUNT
DEMON'S CASTLE
PICTURE DRAW
DIG

ISSUE #57, MARCH 1987
THE BAKERY
ENCHANTED VALLEY ADV.
SAFE KEEPER
WAR 1
BOMB DISABLE
PIANO PLAYER
SPREAD SHEET
SLOT MANEUVER
LIVING MAZE
GEM SEARCH

ISSUE #58, APRIL 1987
ACCOUNTS PAYABLE
PRINTER GRAPHICS
SIMON
PANELING HELPER
MULTI CAKES
CAR RACE
ELECTRONICS I
BATTLE TANK
DISKETTE VERIFY
WEIRDO

ISSUE #59, MAY 1987
GENEOLOGY
HOME PLANT SELECTION
CHECK WRITER
HELIRESCUE
KABOOM
NEW PONG
CROQUET
FUNCTION KEYS
ZOOM
ELECTRONICS 2

ISSUE #60, JUNE 1987
JOB COSTING
LABELS
CATCH A CAKE
COCO MATCH
ROBOTS
STREET RACERS
BOWLING 3
ELECTRONICS 3
GRAFIX
KRON

ISSUE #61, JULY 1987
EZ ORDER
SUBMISSION WRITER
KEYS ADVENTURE
WALLPAPER
CHOPPER COMMAND
UNDERSTANDING OPPOSITES
BIT CODE PLOTTING
ELECTRONICS IV
KING PEDE
RAIDER

ISSUE #62, AUGUST 1987
PENSION MANAGEMENT
HERB GROWING
CATALOGER UTILITY
RAIDERS
ALPHABETIZING
W.F.O.
ELECTRONICS V
RAMBO ADVENTURE
BLOCKS
MULTI SCREEN CAVES

ISSUE #63, SEPTEMBER 1987
GENEOLOGIST HELPER
SMART COPY
MAINTENANCE REPORTING
COCO 3-COCO 2 HELPER
DIRECTORY PICTURE
SUB STTACK
SAVE THE MAIDEN
CAVIATOR
ELECTRONICS VI
MONKEY SHINE

ISSUE #64, OCTOBER 1987
GARDEN PLANTS
FORT KNOX
ELECTRONICS FORMULAS
SNAKE IN THE GRASS
CYCLE JUMP
GEOMETRY TUTOR
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4	12	20	28	36	44	52	60
5	13	21	29	37	45	53	61
6	14	22	30	38	46	54	62
7	15	23	31	39	47	55	63
8	16	24	32	40	48	56	64

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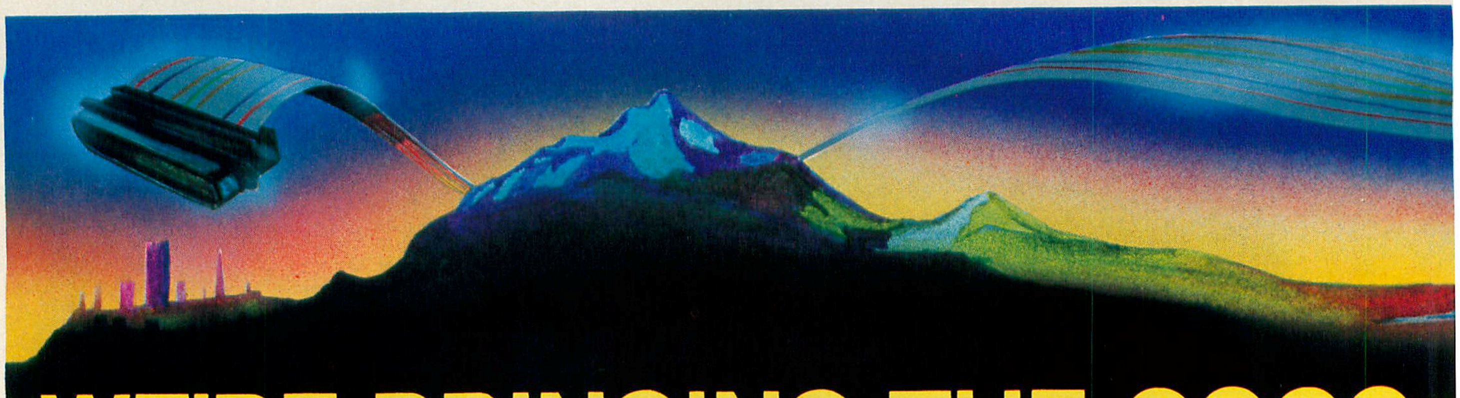

WE'RE BRINGING THE COCO

RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $25 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges. If you do not maintain a positive balance, you will be charged $3.50 each month for direct billing.

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We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

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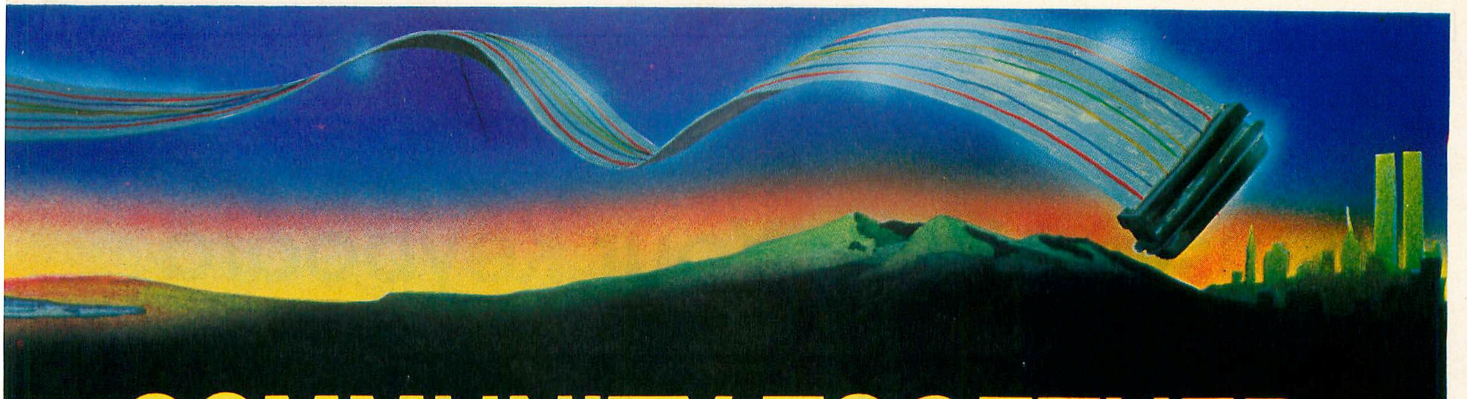

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How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks like Telenet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Telenet or Tymnet. Canadian residents using Datapac will be charged an additional $10.80 (U.S.) per hour.

On Telenet: Uninet network has merged with Telenet. To get the Telenet number for your area, call (800) 336-0437. After you call the local access number and make connection, press ENTER twice. When the "TERMINAL=" prompt appears, press ENTER again. When the "@" prompt appears, type `C DELPHI` and press ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER. Delphi's new rates indicate an additional $10.80 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Telenet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 3110 6170 3088 through Telenet, or 3106 90 6015 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `JOINDELPHI` and press ENTER. At the "PASSWORD:" prompt, type `RAINBOW`. Then, at the "NUMBER:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type `JOINDELPHI` and press ENTER. At the "PASSWORD:" prompt, type `SENDRAINBOW` and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just use Control-X and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

Come Visit Us! Type: `GROUP COCO`

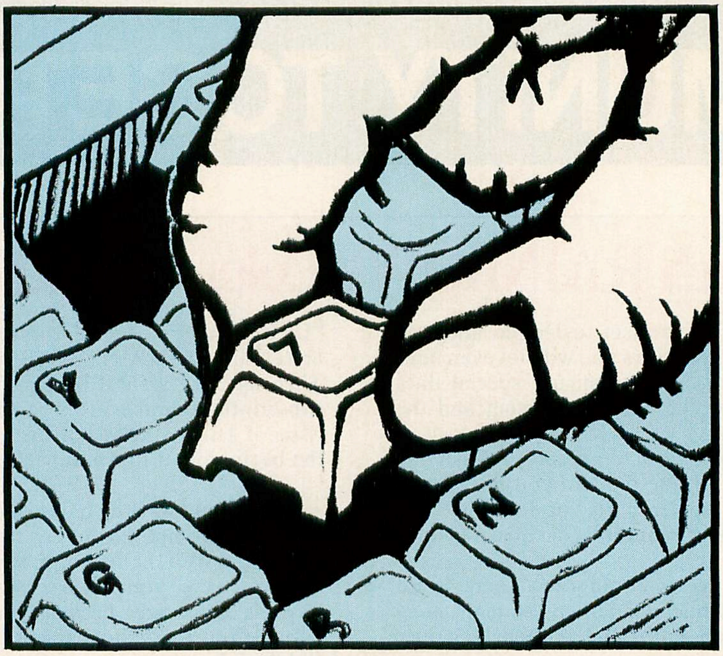
After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is verified and opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen username and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it.

After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

Customizing Your Keyboard



By Allen Drennan

One of the Color Computer's best but least known features is its ability to customize the keyboard keys. Problems that arise in everyday life for the CoCo user now can be solved with a simple poke. How many times have you accidentally pressed the CLEAR key instead of the ENTER key, or pressed the BREAK key in the middle of a program? You can save yourself some grief and prevent these accidents from ruining your life by using the CoCo's special character table.

The CoCo's special character table is situated between locations 41582 and 41601 in memory. This character table defines the ASCII value generated when certain keys are pressed. For instance, the CLEAR key, when pressed, produces the ASCII value 12, which is sent to the computer. The computer recognizes 12 to be the ASCII value to clear the screen; therefore, the screen is cleared by pressing the CLEAR key. The same is true for the ENTER key. The ASCII value of the ENTER key is 13, and it sends a 13 to the computer when pressed. Twenty different keys and their corresponding values are held in the keyboard special character table.

If we were to type `PRINT PEEK(41594)`, the computer would respond with the value 13. This is true only because location 41594 holds the ASCII value of the ENTER key. If we attempted to poke location 41594 with anything else, it would not work, because we cannot change the values of ROM (Read Only Memory). If we could convert this ROM to RAM (Random Access Memory), we could change the value of location 41594.

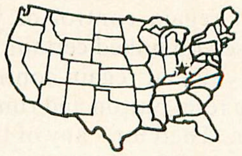
The exception to the above is the CoCo 3. Since ROM is copied into RAM when the machine is first turned on, you won't need to be concerned with doing it later. The changes outlined in this article can be made as soon as the machine is powered up.

Listing 1 is a short program that will copy ROM to RAM so it can be changed. After the program is run, the contents of location 41594 and all others in the keyboard special character table can be altered. Listing 1 will work only if your Color Computer is running at 64K.

The special character chart lists all of the keys in the CoCo's special keyboard character table. If we were to type `PRINT PEEK(41590)` (one of the values in the first column), the computer would respond with the value 32 (the number corresponding to 41590 in the second column). If we were to run Listing 1 and type `POKE 41590,12`, pressing the space bar from that point onward would clear the screen. We redefined location 41590, which was the space bar, to the same value held by the CLEAR key. So now every time the space bar is pressed, the screen clears. Obviously, this example serves no useful purpose, but changing other values in the table can make life extremely easy for the CoCo user.

Allen Drennan has been programming in BASIC, PASCAL and assembly language for nine years. At 17, he holds a degree in PASCAL programming, and is currently enrolled as a senior at Sonora High School, living in Sonora, CA.

CINSOFT



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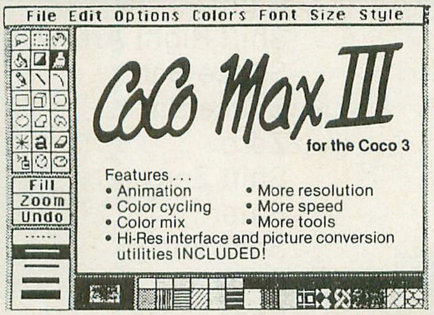

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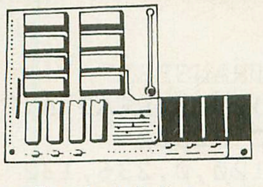

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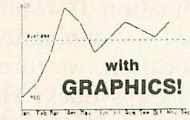

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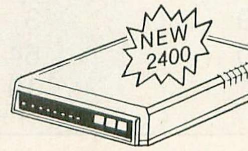

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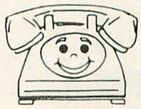

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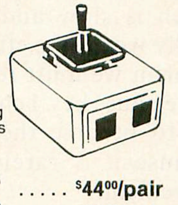

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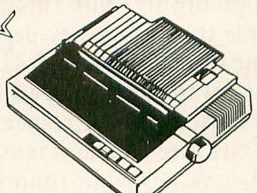

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Run Listing 1 to prepare for your special customizing entries. If you cannot regain control of your system because you poked certain values in the table, you can regain control by pressing the reset button and running Listing 1 again. Therefore, any of the following changes will stay in effect until you press the reset button or turn the computer off.

The Keyboard Special Character Table

Location	Value	Key Press
41582	94	Up Arrow
41583	95	Shift Up Arrow
41584	10	Down Arrow
41585	91	Shift Down Arrow
41586	8	Left Arrow
41587	21	Shift Left Arrow
41588	9	Right Arrow
41589	93	Shift Right Arrow
41590	32	Space Bar
41591	32	Space Bar
41592	48	Zero
41593	18	Shift Zero
41594	13	Enter
41595	13	Shift Enter
41596	12	Clear
41597	92	Shift Clear
41598	3	Break
41599	3	Shift Break
41600	64	@
41601	19	Shift @

The listing:

```
10 REM ROM TO RAM TRANSFER
20 FOR I=32000 TO 32025:READ A:P
OKE I,A:NEXT I:EXEC 32000
30 DATA 26,80,142,120,0,236,132
40 DATA 183,255,223,237,129,183
50 DATA 255,222,140,254,255,37
60 DATA 241,183,255,223,28,175,5
7
```

Easier Pausing

If you ever tried to stop in the middle of listing a program, you know how hard it sometimes is to get the CoCo to pause. Part of the problem is that nasty combination keystroke of SHIFT and @, which is slow and cumbersome and hardly worth the effort. To remedy this problem we must redefine another key to the pause key. I chose the down arrow key to become the pause key simply because it is rarely used and rather convenient.

To change the down arrow key to a pause key, look for the location of the down arrow in the keyboard special character chart. The location is 41584, which contains the value 10. Then we look up the value contained in the shifted-@ location. That value is 19, which is at location 41601. Typing `POKE 41584,19` will change the down arrow to a pause key, leaving all other keystrokes intact, including the shifted-@ combination. In simple terms, we took the value of the shifted-@ key and gave it to the down arrow key.

Disabling the BREAK Key

I have seen many methods for disabling the BREAK key, but none prove to be as simple and reliable as this one. Other methods work only part of the time (sometimes they quit working during input), but this method will disable the BREAK key permanently.

Locations 41598 and 41599 hold the values of the BREAK key and the BREAK and shifted-BREAK respectively. Those who are tired of accidentally pressing the BREAK key while running a program might consider just altering location 41598, leaving location 41599 intact — pressing shifted-BREAK will stop the computer, and BREAK by itself won't function.

Those who want copy protection and total control over the BREAK key might consider altering both locations. Since the ASCII table ranges from values 0 to 255, and since only values smaller than 128 can be accessed through the keyboard, any value above 128 can be used as a garbage value. Therefore, if we type `POKE 41598,255` and `POKE 41599,255`, or just one of those two pokes (depending on which we prefer), we can redefine the BREAK key from ASCII value 3 to ASCII value 255 and render the BREAK key useless to anyone accessing the keyboard.

That Nasty CLEAR Key

The CLEAR key is so close to the ENTER key that you sometimes might accidentally press it instead of the ENTER key. The following poke will solve that problem. Location 41596 holds the value 12 and the CLEAR key. If we type `POKE 41596,13`, the same value as the ENTER key, we redefine the CLEAR key so that it acts as the ENTER key.

A Caps-Lock Key

Last, and one of my favorites, is the ability to create a Caps-Lock key. Once again I decided to use the down arrow key as my victim. Shifted-0, in effect, is a Caps-Lock combination. If we put the value of the shifted-0 combination in the down arrow location, we turn the down arrow into a Caps-Lock. This is accomplished by typing `POKE 41584,18`. This is a handy little feature that everyone will enjoy.

Experiment on your own with the different keys in the table and decide what you like best. The four examples above are just a few of the many different possibilities you can explore. For further information, look up the ASCII table in your Color BASIC or Extended Color BASIC manual.

(Questions may be directed to the author at 15485 Paseo de Los Robles, Sonora, CA 95370. Please enclose an SASE when writing for a reply.)

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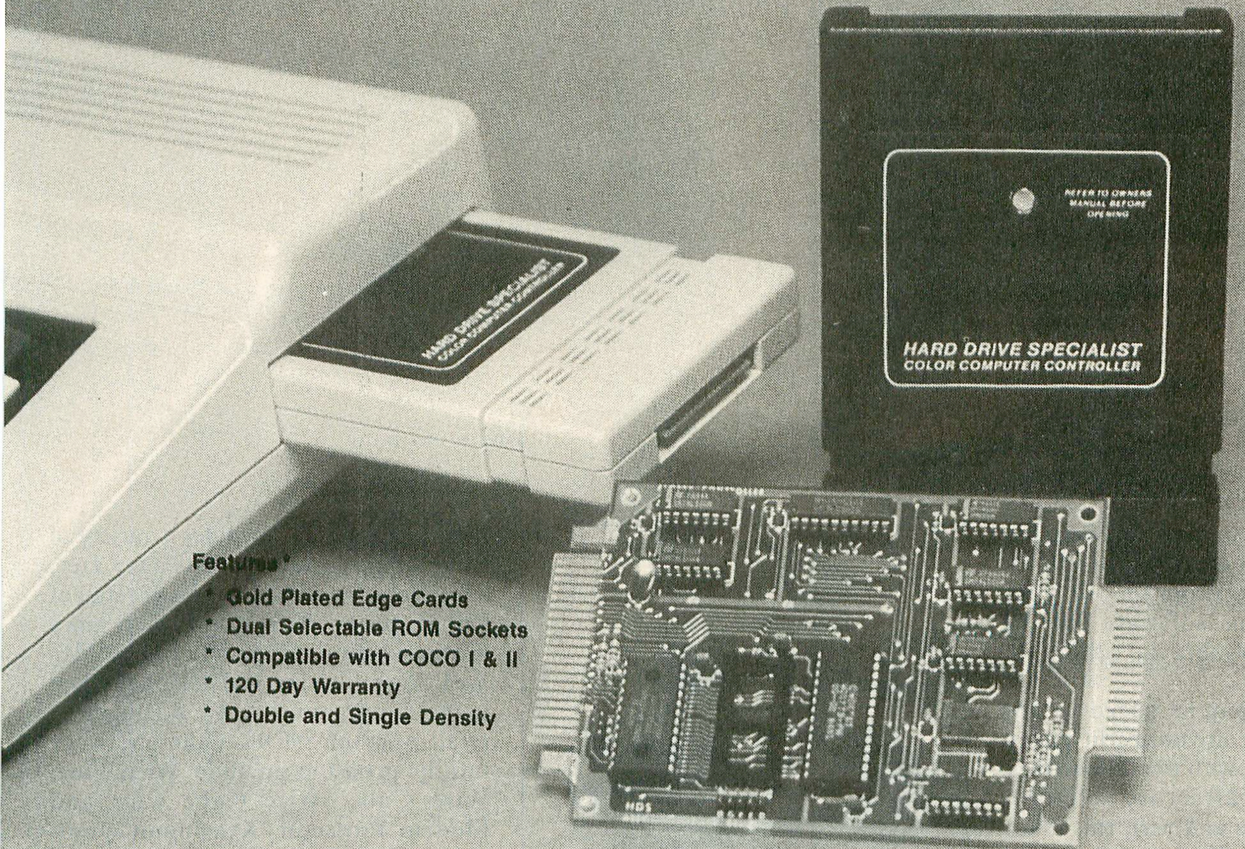
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PIPELINE

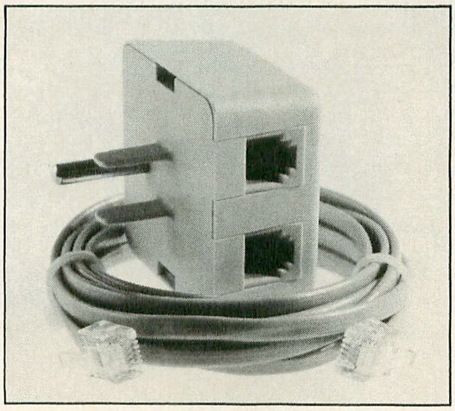
DISK UTILITY Sunrise Software has announced the release of *Superdisk +3*, a multiuse utility program for your CoCo. It contains software for the CoCo 1 and 2, plus a special edition for the CoCo 3.

Superdisk +3 may be added to any disk. It lists disk directories in pages, runs any program with two keystrokes, creates a spare directory, restores crashed directories and performs many other tasks. *Superdisk +3* costs $19.95 plus $2 S/H. *Contact Sunrise Software, 8901 NW 26 Street, Sunrise, FL 33322, (800) 628-2828.*

DEVELOPMENTS Radio Shack has released the *OS-9 Development System* for the Color Computer 3. This system is a complete editor/assembler with full-screen editing and specialty I/O drivers. The development system gives serious, as well as novice, Color Computer programmers tools to develop software programs for their own customized applications. In addition, the package includes several new commands that are useful for creating a multiuser environment as well as drivers for external devices such as hard drives.

The OS-9 Level II operating system is required to take advantage of programming tools provided by the development system. The package (Cat. No. 26-3032) retails for $99.95 and is available at Radio Shack stores nationwide.

STOP THE FLOW Kalglo Electronics has introduced a new model telephone-line/modem voltage surge protector. Designated the Model TLP-2, it plugs into any standard three-prong AC wall outlet and provides convenient modular phone jacks and interface modular phone cables to connect and protect your computer's modem from voltage surges and lightning spikes on the telephone line. Capable of dissipating up to 6,000 v at 14,000 amps, the device discharges high energy surges safely to the ground wire of your electrical system. The TLP-2 utilizes both MOV and gas discharge technologies and is capable of reacting within 1 nanosecond to clamp off spikes harmlessly. The TLP-2 unit costs $39.95. *Contact Kalglo Electronics Co. Inc., 6584 Ruch Road — East Allen Township, Bethlehem, PA 18017-9359, (800) 524-0400.*



The Model TLP-2 from Kalglo Electronics.

ACQUISITIONS Kensington Microware Ltd. has announced that they have acquired the Networx line of surge suppression products. The Networx family of products includes a variety of surge suppressors from the Power Tree, an outlet strip with a suggested retail of $29.95, to the Wire Tree Plus, a more advanced surge suppressor with EMI/RFI noise filtering and telephone line surge suppression, with a suggested retail price of $99.95. Other Networx family products include Wire Tree, Wire Cube, Wire Cube Plus and Modem Protector. Kensington products are available through computer stores nationwide. *For the name of the dealer nearest you, contact Kensington at (800) 535-4242. In New York, call (212) 475-5200.*

CONGRATULATIONS Anchor Automation, a manufacturer of modems for PCs, recently announced the shipment of the company's millionth modem. George Eisler, president and founder, said, "This marks a significant milestone for Anchor Automation, and for the whole industry. Back in 1980 when the company was founded, no one could accurately foresee the demand for computer communications that has materialized. We are grateful to have played a major role in the industry's growth."

Anchor Automation, a privately held California corporation, manufactures the Signalman and Volksmodem product lines. Their modems, available from 300 to 2400 baud, are distributed by more than 1500 dealers. *For further information, contact Anchor Automation, 20675 Bahama Street, Chatsworth, CA 91311, (818) 998-6100.*

The Times Are A-Changin'

By Cray Augsburg
Rainbow Technical Editor

Delphi is a continually changing information system. This is why most users find the system gets easier and easier to use. Rather than set the system up a certain way and never allow any room for change, Delphi listens to its users and makes changes the users would like to see.

Call it a self-honing process, if you will. The point is, the end users of the system give the SIG staff feedback regarding certain aspects of the SIG operation. While most of the changes required cannot be performed by us, but must be performed by Delphi service, we do use that information to show Delphi what changes are needed. They usually follow through.

In addition, the people who work for Delphi and the SIG staff are continually searching for other ways to improve the system. For example, as **Don Hutchison** (DONHUTCHISON) explains in the Database Report, he recently took a long, hard look at how the graphics area of the database was arranged. All graphics files were put under one topic regardless of the machine and/or software for which they were intended. Don suggested some changes to the rest of the SIG staff, everybody put in their "two bits," and now the graphics database has been split in two. This makes finding graphics images for your specific machine much easier.

"What am I getting at?" you might ask. I am suggesting that you make RAINBOW's Delphi CoCo SIG your very own. If you see something you feel should be altered, *let us know*! Sometimes we might have a good reason for not wanting to change something, but no suggestion is too small for us to take a little time to consider. To make your suggestions known to the SIG staff, just use the Feedback to SIG Staff selection in the Rainbow Magazine Services menu. Again, we welcome any information that would make Delphi use more convenient.

Database Alterations

Speaking of making changes to the system, Delphi has recently made some

---

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Database Report

In order to provide greater convenience for our users in the CoCo SIG, we have split the former Graphics topic of the database into two topics, namely "CoCo 3 Graphics" and "Classic Graphics." The Classic Graphics topic will contain graphics utilities and `PMODE 3` and 4 graphic images that may be displayed on a CoCo 1, 2 or 3; the CoCo 3 Graphics topic will contain graphics and utilities that are specific to the CoCo 3.

We will also be creating an Archives topic in the database that will contain archived Forum threads and other information that should be retained in a database topic. Look for this topic in the next few weeks.

OS-9 Online

In the General Information topic area, **Steve Clark** (STEVECLARK) uploaded his program that puts "OS-9" in giant letters on an 80-column text screen.

In the Users Group topic area, SIGop **Greg Law** (GREGL) posted a description of the User Group files in a text file that's already formatted and printer-ready; *Sled*, a full-screen text editor for CoCo 3 OS-9 Level II that also supports windows; *NROFF*, a Unix-style print formatter; *DATELIB*, a Julian date conversion utility; *Dates*, to keep track of dates, appointments, birthdays, etc., and warn if they are coming up; and *D*, a directory utility similar to *LS* that lists one file per line with wildcards.

In the Utilities topic area, Greg Law posted *Alarm*, which allows one to set, display, or clear an alarm using the new `F$Alarm` call (the program is courtesy of Dan Robins). Greg also uploaded *SYSINFO*, a BASIC09 procedure that can be used in other programs or as a stand-alone assembly version to display the window number, screen type, window size, current foreground, background, and border palette register numbers, and a list of all 16 current palettes and the colors contained therein. (*SYSINFO* is also courtesy of Dan Robins.) **Rick Adams** (RICKADAMS) uploaded *CC2* for those with Level II, 512K and the C compiler. This implementation

---

Don Hutchison is an electrical engineer and lives in Atlanta, Georgia. He works as a senior project engineer involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW CoCo SIG. His Delphi username is DONHUTCHISON.

which should make downloading specific files much easier. When looking for certain types of files in the different database topic areas, most people find it convenient to use the `SEARCH` command. In the past, entering this command took you to a "mini" menu from which you could start the search for specific keywords. Delphi has altered this so you no longer go to the other menu. Rather, entering `SEARCH` at the DBASES prompt automatically clears any previous search keywords and begins a new search.

To supplement the search process, the `NARROW` and `WIDEN` commands, which used to reside in the Search menu, have also been placed on the DBASES menu. The `NARROW` command allows you to "fine tune" the search. Obviously, then, `WIDEN` allows you to make a broader search than you had originally intended when you issued the `SEARCH` command.

In addition, you can get a list of keywords used to help you in narrowing a search by typing a question mark at the keyword prompt. Actually, you will have to enter two question marks since the first one you enter will call the help screen for the `NARROW` command. The only keywords that will be in the list will be those that match at least one of the keywords used to describe at least one of the files already selected by the `SEARCH` command.

This may seem a little confusing, but it is really quite easy to understand. Let's assume you are at the DBASES prompt for the Utilities and Applications topic. You have a CoCo 3 and all you are interested in are programs intended for that machine. So, you type `SEARCH` and press ENTER. When prompted for the keyword to search on, you enter `COCO3`. Now, the search routine will go through all the groups of files in the database, looking for any which have `COCO3` as a keyword. All such files will then be considered "selected." From that point on, only those groups will be "active" whenever you enter `DIR` or `READ`.

Now, if you are looking for filing programs, you might want to narrow the search a bit. Simply enter `NARROW`. When prompted for the keyword to narrow the search, enter a question mark. After the help screen explains the `NARROW` command, enter a second question mark. You will see a complete list of the keywords used in the groups you selected. You might see one that is related to filing programs. Simply enter the appropriate keyword and the search will be narrowed. Any selected files that do not contain that keyword will be deselected.

When you have found the file you are looking for, you can then download it. Once the program is downloaded, you might want to search for something else. Simply enter `SEARCH` again and the present search keywords will be cleared. At this point, you can enter another keyword or, if you just want to look at the directory of all groups in the topic area, simply press CONTROL-Z. If you should use `SET` to choose a different topic area of the database, all `SEARCH` parameters are also reset. To repeat, the `SEARCH` parameters you choose one

---

of *CCI* combines the `C.PREP`, `C.PASS1`, `C.PASS2` and `C.OPT` steps via pipes, and has many options. Most of these are identical in function to the *CC2* command that is described in the C compiler manual but non-existent on the C compiler disks.

In the Applications topic area, **Mark Sunderlin** (MEGABYTE) uploaded his phone "words" generator program that generates easy-to-remember mnemonic names from phone numbers. This program prints out all possible "words" that a given phone number creates. (Example: 667-5263 is 667-MALE.)

In the Patches topic area, Greg Law furnished a text file that describes a bug and the fix for *RMA* Version 1.1 as supplied with the OS-9 Level II Developers System. It corrects a minor bug in the listing format when using the "-l" option.

In the Telecommunications topic area, **Bill Brady** (WBRADY) uploaded `WIZUP.TXT`, a report of problems that people have had with his terminal program, *The Wiz*.

In the Graphics and Music topic area, **Ray McCopin** (RAYMCCOPPPIN) uploaded `ICE.AR`, an icon editor for OS-9 Level II with 512K. It features full-screen editing of icons and patterns for use in other programs.

CoCo SIG

In the CoCo 3 Graphics topic area, **Michael Schneider** (MSCHNEIDER) uploaded three more adult conversions from Atari ST pictures as well as MGE pictures of Marilyn Monroe. I posted several more MGE pictures, including a revised picture of Little Red Riding Hood, a nude shot of Elvira, a version of the three Microware programmers, a sample of the works of Ron Kiyomura converted to MGE format, and a few other conversions from Ana Landa's `PMODE 4` graphics. **Richard Trasborg** (TRAS) posted an adult picture called "Charla" and a grouping of three MGE nudes drawn by Mike Trammell. **Victor Ricker** (JACKRIPPER) provided an outstanding utility for viewing ST pictures in "Tiny" format on a CoCo 3. (This utility is written in machine language and is very fast.) **Bob Wharton** (BOBWHARTON) uploaded a picture from the movie *Top Gun*, and **Michael Fischer** (MIKE88) uploaded a picture of the logo for Carnegie Mellon University. **Noel Fallon** (FALLON) graciously furnished four of his original drawings in an Oriental grouping.

In the Classic Graphics topic area, Victor Ricker sent us a fine utility for viewing Koala pictures on a CoCo `PMODE 4` screen. **Earl Knutson** (BJORNKNUTSON) provided the program called *Graffiti* that adds legends to CoCo 1 graphics screens. Since the program required Dick White's copyrighted character generator, **Dick White** (DICKWHITE) then provided the character set from his program to complete the program. **Ana Landa** (ANA) posted a second gallery collection of her `PMODE 4` artwork, drawn using *Graphicom*. **Jason Forbes** (COCO3KID) sent us some more digitized Max pictures. I posted a text file describing the format for RLE-encoded picture files.

In the Source for 6809 Assemblers topic area, I provided the source code for a fast disk initializer for the CoCo 1 and 2. **Roger Krupski** (HARDWAREHACK) provided the source code to his *Copy* command enhancement program and the source code for the CoCo 3 character set. **Doug Masten** (DMASTEN) uploaded a popular fast disk duplicating utility for the 512K CoCo 3.

In the Utilities and Applications topic area, Richard Trasborg uploaded a fine VCR cataloger program for the DMP-105 Tandy printers. Richard's program will catalog over 2,000 tapes, and will work on all CoCos. **John Malon** (JOHNLM) uploaded a disk directory utility that will print an organized directory listing, optionally sorting the directory in alphabetical order. Roger Krupski supplied his *CoCo 3 Super Patch*, a complete CoCo 3 enhancement program that fixes all the known bugs in Super Extended Color BASIC and adds several new commands and functions. It is written for the CoCo 3 under Disk Extended Color BASIC Version 2.1 only. Michael Fischer sent us a BASIC program for comparing the lengths of individual files versus their archived length. **Craig Shelton** (JAYBACK) provided us with *LCSCREEN* to set newer CoCo 2s to true lowercase when in the 32-column mode. Michael Schneider uploaded *TC3*, the CoCo 3 version of the very popular *The Compressor* program by John Lauro for `ARC`ing and un-`ARC`ing files.

In the Hardware Hacking topic area, I posted a description of a bug in disk BASIC and a fix for it. This bug pertains to the time are erased if you leave the database or log off the system. They are not permanent.

Keep in mind that the SEARCH command is on the DBASES menu, which means you can no longer type SE GRA to change to the graphics database topic. In fact, the way Delphi has arranged the priority of the two commands, entering SE will cause the system to default to SEARCH. To change topic areas, you must enter SET.

In addition to the SEARCH changes above, Delphi has done quite a bit toward making downloading easier. Until now, the DOWNLOAD command (abbreviated DO) has been used only for buffer capture downloads. You would use the commands XMODEM, KERMIT or YMODEM instead for an error-checking download. Now that Delphi supports so many file transfer protocol variations, however, they have consolidated these commands into a new DOWNLOAD command. The first time you use DOWNLOAD after logging in, you will get a menu of the different transfer techniques available. Pick the one you normally use. If the transfer is successful, your choice will be remembered for the rest of the session. For most CoCo users, the chosen protocol will be Xmodem. But first, make sure your terminal software supports this protocol.

It is also possible to bypass the Download menu. You just need to enter the chosen method on the same command line with DOWNLOAD command (e.g., DO XM). If you want to download only the third file in a group, you would enter DO 3 XM.

If you consistently use a particular file transfer protocol (often the case with the CoCo), you can make that your default selection by using profile commands. Entering the following two lines will cause the DOWNLOAD command to default to the Xmodem protocol:

```
/FX_METHOD XMODEM
/SAVE
```

Note: To enter the underscore character with the CoCo, press and hold the SHIFT key and then tap the up arrow key.

You can also find out what your currently selected download protocol is by typing /FX_METHOD and pressing ENTER. Once you have selected a preferred file transfer method, the way to override it temporarily is to type DOWN MENU to get the download menu. Or, you can enter /FX_METHOD NONE followed by /SAVE to clear out your preference.

Another addition to the database software on Delphi is the SHOW command. This command, available from the ACTION prompt in all database topic areas, redisplays the file entries for the current group (the one you just read). You can redisplay just one file entry by typing SHOW, following it with the number of the entry in question and pressing ENTER. For example, to see the specifics about the fourth file in the current group, simply enter SHOW 4. If you want to see all the files for the group, enter SHOW by itself or SHOW *.

We feel each of these alterations will make life a little easier for Delphi and CoCo SIG users. One of the more confusing aspects of telecommunications to any new user is downloading. By making the databases a little easier to understand, as well as work with, users will be able to spend their online time more productively. ☐

use of the DOS command after an operation with a drive other than Drive 0.

In the Games topic area, **Fred McDonald** (FREDMCD) uploaded his excellent Monopoly game, and **Stephen Macri** (DRACMAN) sent us his fine *Tiahna* program, an experiment with artificial intelligence programming.

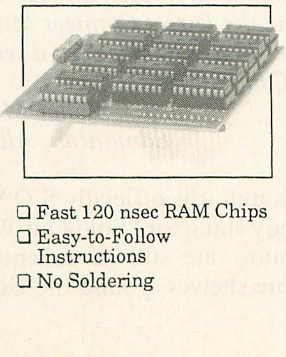
I'd like to add a note of clarification about a previous database report. The game *CRESCUE*, which is online in the games topic of the database, was originally written by **Greg Clark** (GNOME) and released to the public domain. It was uploaded to us by **James McDaniel** (NEWKID) during July. *CRESCUE* is an excellent game, featuring several well-drawn Hi-Res screens and very interesting action. Thanks, Greg and James, for sending us an outstanding game!

In the Product Reviews and Announcement topic area, **Mike Banks** (KZIN) posted an announcement concerning the new Delphi manual which will be available in bookstores soon. This manual will be adopted by Delphi as the official handbook for its users.

In the Data Communications topic area, **Marc Genois** (MARCGENOIS) uploaded Version 2.5 of the popular *Ultimaterm* terminal program for the CoCo 3. Before starting an Xmodem download with *Ultimaterm*, make sure you have it configured for an eight-bit word length and no parity. You may want to sign onto Delphi using these settings to avoid having to change them back and forth between seven- and eight-bit settings for each download. This is due to the fact that *Ultimaterm* doesn't adjust its terminal settings automatically for an Xmodem transfer, so the user has to handle the changeover manually.

See all of you online on Delphi!

— Don Hutchison
Rainbow CoCo SIG Database Manager



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Automatic PCLEAR

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Is there any way to have my programs automatically do a `PCLEAR0` *with Disk BASIC?*

Mary Willingham
Omaha, NE

℞ Place the following routine at the beginning of your program. This causes the program to relocate itself to &H0E01.

```
  10 GOTO 5000
  20 DATA BD,B3,ED,1F,02,
     7E,96,A7
  30 RESTORE:FOR X=0 TO 7:
     READE$:NEXT
  40 Place your program here
5000 CLEAR200:FOR I=0 TO7:READ
     E$
5010 POKE&HE01+I,VAL("&H"+
     E$):NEXT
5020 DEFUSR0=&HE01:X=USR0
     (&HE09)
5030 GOTO 30
```

Label Jam

I have a DMP-100 printer that I use with my CoCo 2. When I use mailing labels in the machine, I have to advance the platen by hand. It seems that the paper is too thick for the machine to advance automatically. I have adjusted the print head, but this does not help. Are there any other adjustments I can make to the machine that will advance the paper automatically?

Bob Kemether
Bricktown, NJ

℞ There are thinner labels available that will feed properly. Check with a local business forms supplier or one of the many mail order firms.

Getting Online

How do you link up Radio Shack's Deluxe RS-232 Program Pak with a BBS? Specifically, what should my terminal settings be (I know the baud rate should be set to 300). Should my Modemphone be set to answer or originate? How do I "ask" a question or request to copy a program? Do I have to buy a terminal program or can I get an acceptable program from the BBS without any great programming skill?

Luis Modesto
Miami Beach, FL

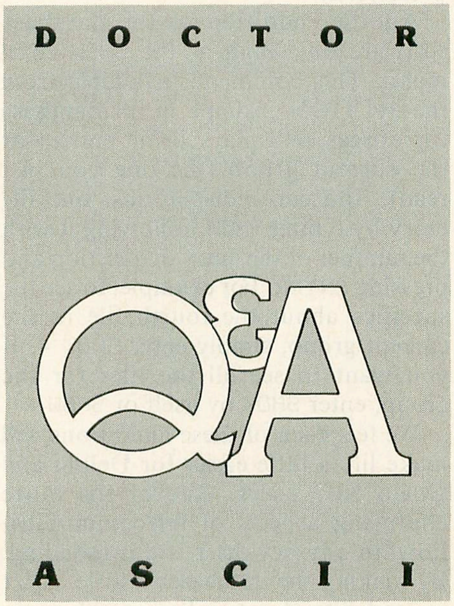
℞ Set the phone to originate. Get a terminal program with Xmodem protocol, which will allow you to upload and download programs virtually error-free. The settings for most BBSs, including Delphi, would be 300 baud, 7 bits word length, even parity, 1 stop bit.

In Search of a Canadian Pak

To be able to use the terminal program within DeskMate 3, *I need an RS-232 Pak. In Canada, I'm told that this hardware was discontinued two years ago. Is there some kind of fix I could use short of sending to the states for the equivalent of the elusive RS-232 Pak? Radio Shack software support personnel didn't seem to be aware the RS-232 Pak was gone from the shelves and could not give any advice other than to buy the Direct Connect Modem ROM Pak. I have no need for a second modem! Can you help?*

Walter Medak
Edmonton, Alberta

℞ Although it is officially S.O.W.G. (Tandy slang for "Sold Out When Gone"), many are still in warehouses and on store shelves around the United



Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

*** *** *** *** COLOR COMPUTER III SOFTWARE *** *** *** ***

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The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only avialable to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk $149.00

DATAPACK III PLUS V1.1

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- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, $59.95

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128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk $59.95

TEXTPRO IV

"The ADVANCED COCO-3 Word Processing System"

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- On Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
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- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
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- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily imbed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing. then TEXTPRO IV is what your looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk $89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpl.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. Hi-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk $34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that *will give you 2 ULTRA* High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
- Automatically locates Begin, End and Execution address.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk or printer.
- Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
- Written in Ultra Fast Machine Language.

Requires 128K & Disk $49.95

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Las Vegas, Nevada 89110
(702) 452-0632

States. Contact mail order suppliers advertised in THE RAINBOW. P.B.J. also offers a compatible RS-232 Pak.

Old Drives and OS-9

I have a CoCo 1 with 64K, a DMP-200E and two disk drives and recently purchased a CoCo 3, color monitor, the new disk drive unit and DeskMate 3. *When I used my old drives with the CoCo 3 disk controller and tried to load* DeskMate 3, *all commands would work except the DOS command. I do not get an SN Error, but nothing happens. Are the old disk drives compatible with the new disk drive units when hooked to the other disk controllers? If so, then why don't mine work?*

Dennis Restorff
Ft. Lewis, WA

℞ The old drives are compatible, but the old 12-volt controllers, even with 12 volts supplied by a Multi-Pak, cannot handle the 2 MHz clock speed of OS-9 Level II under which *DeskMate 3* runs. You need a newer 5-volt controller.

Tapefix Fix

I was looking through back issues of 80 Micro *when I came across a program called* Tapefix *that appeared in your July 1986 column. It was described as being written for Disk Color* BASIC *1.0. What, if any, changes need to be made for* TapeFix *to run on Disk Color* BASIC *1.1?*

Bill White
Live Oak, FL

℞ *Tapefix* is fully compatible with Disk BASIC 1.1. At the time the article was written, Disk BASIC 1.0 was the only version available and I was playing it safe so that when 1.1 came out, I would not get a flurry of mail if it was not compatible.

CoCo Goes Hollywood

I read in Newsweek *(August 10, 1987 issue) that several software companies have written software for personal computers that would enable a user to put special effects, color titles and other goodies on videotape either in real time or during edit sessions. These programs allow the home user to make "home movies" of the kids that have extra pizazz. Have you heard of anybody selling or planning to sell this type of program for the CoCo?*

Bob King
New Bern, NC

℞ Simply hook your CoCo to your VCR via the antenna terminals, or if you have a CoCo 3, via the composite video jacks. Then *CoCo Max*, *Color Max*, *Deskmate 3*, etc., can be used to design fancy title screens for your home movies.

Data Line Dilemma

Can you tell me why the following program won't work with any number except 123? Any other number in Line 120 gives a Y$.

```
10 CLS
20 READ A
30 X$=" IT IS A MATCH
40 Y$=" IT IS NOT A MATCH
50 Z$=" ANOTHER NUMBER?"
60 INPUT"TYPE A NUMBER;"N
70 IF N<>A THEN PRINT Y$
80 IF N=A THEN PRINT X$
90 PRINT:PRINTZ$:PRINT
100 RESTORE
110 GOTO20
120 DATA 123,132,213,231,
    312,321
```

Joseph A. Champagne
Ft. Lauderdale, FL

℞ The RESTORE statement in Line 100 makes the first number in the list of DATA statements available to the next READ, which occurs at Line 20. Perhaps this is what you really wanted:

```
10 CLS
30 X$=" IT IS A MATCH
40 Y$=" IT IS NOT A MATCH
50 Z$=" ANOTHER NUMBER?"
60 INPUT"TYPE A NUMBER;"N
62 FOR I=1 TO 6
63 READ A
80 IF N=A THEN PRINT X$: GOTO 90
85 NEXT I
87 PRINT Y$
90 PRINT:PRINTZ$:PRINT
100 RESTORE
110 GOTO60
120 DATA 123,132,213,231,
    312,321
```

Pirate Protection

I have a CoCo 3 and am creating a BASIC *program that I don't want people to be able to break into and put their own names on. What I have done is disable the* BREAK *key and reset button, so that part is taken care of after the program is running. But I can't stop someone from just loading and then listing it. I was wondering if there is a way to create an autostart (disk) for my program. If there isn't, could you please tell me if there is some software that will do this?*

Erik Yoder
Evanston, IL

℞ Microcom Software, P.O. Box 214, Fairport, NY 14450, (716) 223-1477 markets *Disk Anti-Pirate*, $59.95, which would seem to meet your needs.

Typewriters as Printers

I have a Brother Pro-7800 Correct-0-Ball typewriter, and I heard from a friend that you can hook a Brother typewriter to a Color Computer. Can I do this with my typewriter? How would I go about doing it?

Tim Sternburg
Thousand Oaks, CA

℞ If the typewriter has an RS-232 serial or a Centronics parallel interface, it can be done quite easily. If it has a serial interface, you need a custom cable. If it has a Centronics parallel interface, you need a serial-to-parallel interface.

Random Request

How can I get a listing for the RANDOM *routine? I started learning ML and need a complete listing to create my program. I am editing the program on* EDTASM+ *(disk or ROM).*

Jean Gravelle
St. Rose De Lima, Canada

℞ Disassemble the code starting at $BF1F, which is the entry point to the RND() routine; or better yet, get copies of the "CoCo Unravelled" series, which is sold by Spectrum Projects, P.O. Box 264, Howard Beach, NY 11414.

TEC Drives Zap Directories

I now have a CoCo 3 and two FD-500 drives. I also use the disk utility DU-3 *(February '87) to load my programs from disk. After loading a program with* DU-3, *I list it and find out*

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I have half of one program and half of a second program. I can't do a `DEL` *to separate the second program. Even typing the line number and* ENTER *will not delete any lines. I must load the two half-programs into* VIP Writer *and then edit the mess. This never happened to me with my CoCo 2.*

Edward Russell
Key West, FL

℞ Since you have the early, full-height TEC drives, which were notorious for going out of alignment and zapping directories and granule allocation tables, my guess is they are the problem. I suggest that you get rid of the TEC drives and replace them with new half-height, double-sided ones. I also suggest that you replace your 12-volt controller, because the newer 5 volt-only ones will handle the 2 MHz speed of OS-9 Level II where the older 12-volt ones will not.

Disk Errors With *DeskMate 3*

I recently upgraded from a CoCo 2 to a CoCo 3 because I needed more memory, but I was dismayed to find out that I did not have any more memory to access via BASIC. Everybody says I have to use OS-9 to access all of the memory. I tried DeskMate 3, *but there was no disk space to store even a small file. So then I bought drives 2 and 3. When I try to use drives 2 and 3 for data storage, I get disk errors. Can you help?*

J. O.
Deland, FL

℞ *DeskMate 3* comes configured for two drives. Using OS-9 Level II, you need to create a new *Deskmate* disk using `CONFIG`. When selecting system options, be sure to select `TERM_VDG`, since *DeskMate* uses that mode. You also need to select D2.dd and D3.dd to access drives 2 and 3.

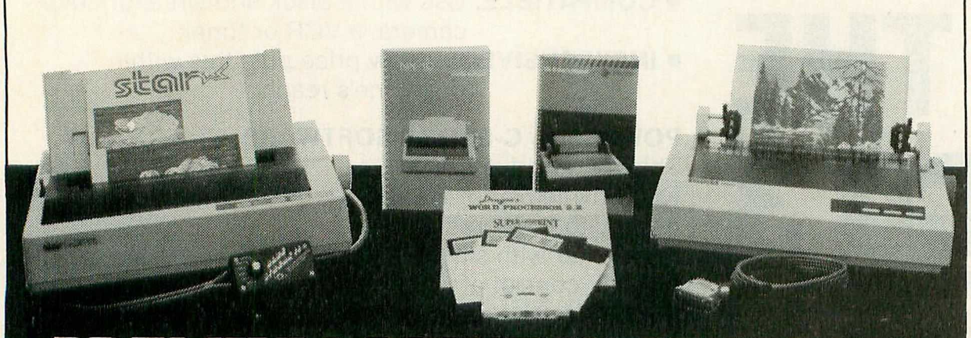
All-RAM and EPROM Defined

In many issues of THE RAINBOW *I have seen uses for the CoCo's "all-RAM mode" and have seen the term "EPROM" used many times. Unfortunately, I haven't seen a definition of either and am compelled to ask what is probably a dopey question . . . What do the terms mean?*

Tom McLarnan
San Francisco, CA

℞ When the CoCo is first turned on, the memory is configured so that the lower 32K of the 64K address space is occupied by RAM and the upper 32K with ROM. The 6809 microprocessor looks at addresses $FFFE to $FFFF to find where in this memory to start executing code. The code in the CoCo 3 that is executed eventually switches the CoCo into a mode where the ROMs are switched out of the 64K address space, and this is called the "all-RAM" mode. A ROM is a memory chip pre-programmed at the factory and retains its programming even when the power is off. An EPROM is similar to a ROM, but it can be programmed at home with a special hardware device called an EPROM programmer. To the computer, ROMs and EPROMs are essentially equivalent.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.



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Reviewed in '87 March Rainbow

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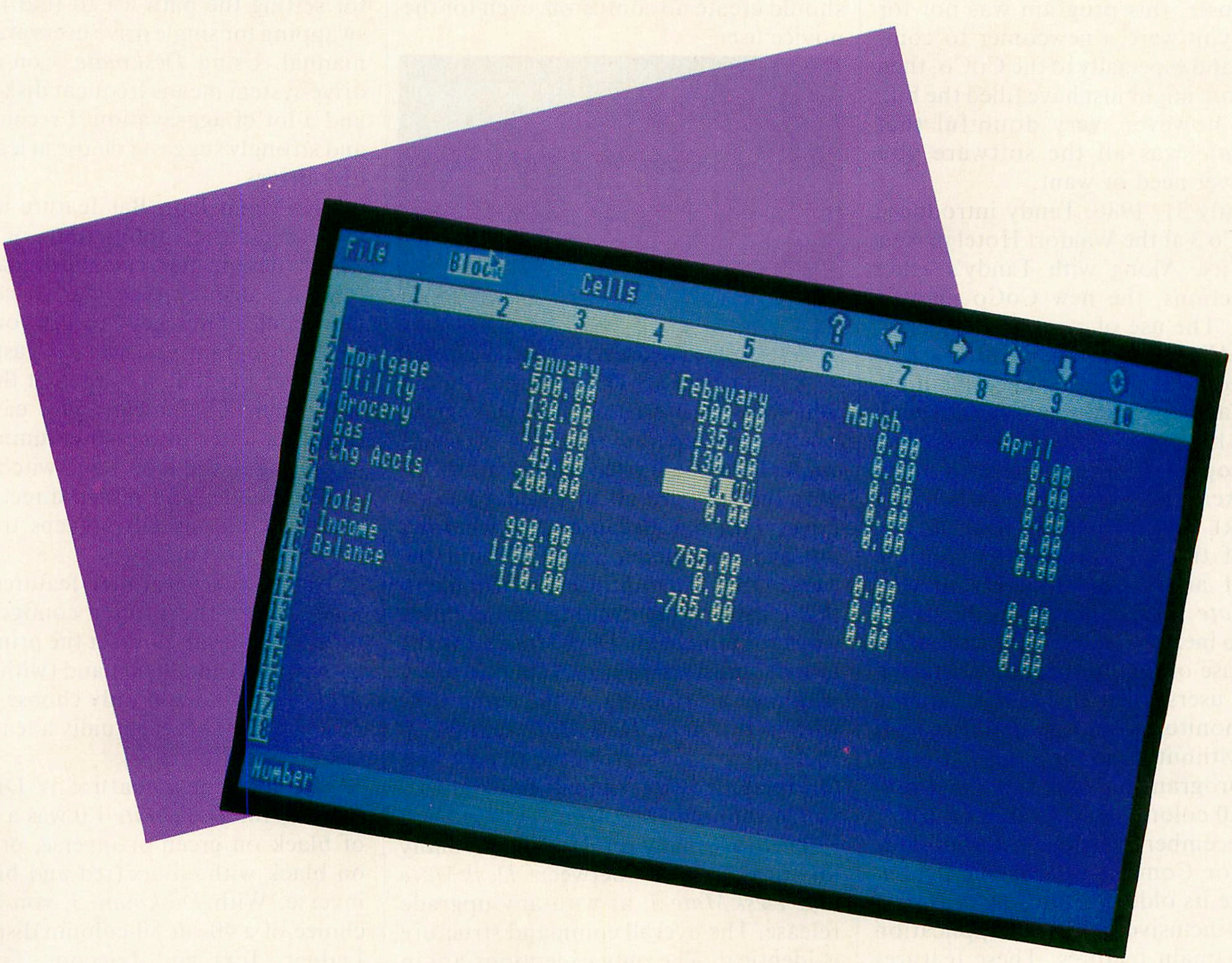


```
File      Block      Cells
  1     2     3     4     5     6     7     8     9    10
 1
 2 Mortgage       January
 3 Utility         500.00     February
 4 Grocery         130.00       500.00      March
 5 Gas             115.00       135.00       0.00      April
 6 Chg Accts        45.00       130.00       0.00       0.00
 7                200.00         0.00       0.00       0.00
 8 Total                         0.00       0.00       0.00
 9 Income          990.00                    0.00       0.00
10 Balance        1100.00       765.00                  0.00
11                 110.00         0.00       0.00
12                             -765.00       0.00       0.00
13                                           0.00       0.00
14                                                      0.00
15
16
17
18
Number
```

Software CoCo 3

DeskMate 3 — Some Important Extras for CoCo 3

In the fall of 1985, Tandy introduced *DeskMate*, its new software package for the CoCo. The program was based in the powerful Unix-like operating system for the Color Computer, OS-9. It had windows, online help, mouse control, colors, and was a thorough, integrated package with all the features anyone could want. *DeskMate* for the CoCo was designed to rely heavily on pop-up screens, menus, mouse control and its integrated features.

This sounded terrific, and for those of us who eagerly tore open the package, we were not disappointed. But we soon discovered that we needed a modem and had to have a multipack interface and an RS-232 Pak to use Telecom. We were in a 40-column upper- and lowercase screen environment. One disk drive was not enough. Any non-Tandy printer needed some fiddling with to get graphics printed, and we couldn't send anything faster than 1200 baud to that printer, due to OS-9's limitations.

The manual was masterful. It had beautiful color screen examples scattered liberally throughout, lots of appendices, and an index. It even had a thorough tutorial to help with all these wonderful new programs. Many of us noted with quickening pulse the many references to an ALT key and a CTRL key. We found out that Telecom had only Xon/Xoff file transfer protocol. But mostly, we were all happy and made good use of the software.

I already mentioned a few of the hardware and software limitations, which are critical when dealing with integrated software packages. By and large, no one can cram all the features of a dedicated word processing package into a module of an integrated software system. Remember, the main objective for *DeskMate* was integration, or having all programs and functions available from one central disk, without having to constantly swap programs and disks.

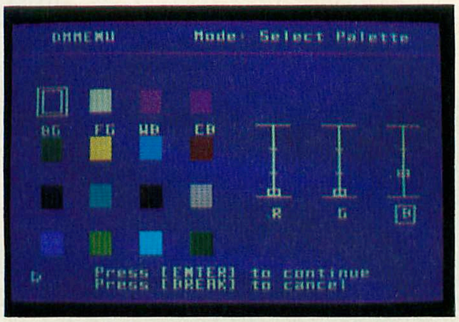
Inherent in all integrated packages is the compromise of features versus complexity. Users quickly discovered with the text editor that it was very, very straightforward. For instance, there was no quick or easy way to set double-spacing. Something as basic as that was either very difficult or couldn't be done. You could possibly figure out a way, by issuing printer escape codes before booting *DeskMate*, but the average user wouldn't know how.

Chances are good that if you were a hard-core *Dynacalc*, *Telewriter 64* or *Profile* user, this program was not for you. If you were a newcomer to computing, and especially to the CoCo, then *DeskMate* might just have filled the bill. It was, however, very doubtful that *DeskMate* was all the software you would ever need or want.

On July 31, 1986, Tandy introduced the CoCo 3 at the Waldorf Hotel in New York City. Along with Tandy's other introductions, the new CoCo made a real hit. The use of a proprietary chip, the GIME, made it possible for the new CoCo to utilize more banked memory. It had a graphics display system with built-in high resolution text drivers and an analog RGB port, along with many other exciting features. It even had ALT and CTRL keys. Moreover, it would run most of the software written for the CoCo 1 and 2, and that meant that *DeskMate* 1.0 would run on the CoCo 3. It also meant that, because *DeskMate* makes use of high resolution artifacted colors, users with the CM-8 Analog RGB monitor would be unable to get color without running a special color patch program to bring out the *DeskMate* 1.0 colors on an RGB monitor.

In December of 1986, *DeskMate 3* for the Color Computer 3 became available. Like its older version, *DeskMate 3* is an all-inclusive integrated application with six main features. These features and subfunctions are very similar to those of the original *DeskMate*, but include some important extras and enhancements that take advantage of the greater memory and graphics capabilities of the CoCo 3. Perhaps the most important feature is 128K memory expandable to 512K. It allows the CoCo 3 to run OS-9 Level II, which can function only on machines with a minimum of 128K RAM. OS-9 Level II is important for several reasons. First, it takes advantage of more than 64K RAM, so there is much more user-available memory storage. Secondly, it has excellent file handling capabilities. And, it has windowing and greater graphics facility, making *DeskMate 3* more easy to use in some ways, and giving it features that cannot be implemented on standard *DeskMate* 1.0.

A very good feature of *DeskMate 3* is that it runs by simply typing `DOS` into the computer. OS-9 is transparent to the user; therefore, you do not have to worry about trying to master it. There are two exceptions: You must type a pathname at certain places in *DeskMate*, and you must swap disks at certain other places. This is still handled straightforwardly in the manual and should create no confusion, even for the novice user.



```
Press [ENTER] to continue
Press [BREAK] to cancel
```

A note here to OS-9 users: Should you want to use either the package as a whole or separate modules of *DeskMate*, it can be started from within OS-9 as the files are all in standard OS-9 Level II format. Because seven windows are available under Level II, and because OS-9 is a multiuser environment, this creates some exciting and creative ways to implement *DeskMate 3* for the more sophisticated user. Imagine seven windows all running at the same time with a different *DeskMate* feature in each, all available from the CLEAR key. Or, imagine two terminals hooked to a CoCo running *DeskMate*.

There are many similarities and many identical features between *DeskMate* and *DeskMate 3*, as with any upgrade release. The overall command structure is identical. The only exceptions are in implementing new features, which follows consistently with other command formats; the @ key is replaced by the ALT key on the CoCo 3, and the CLEAR key is replaced by the CTRL key on the CoCo 3.

There are several important changes in the *Deskmate 3* main menu. The first is noticeable right away, a little trash can icon in the lower-right corner labeled "trash." This trash can is used to delete files when using the mouse or joystick cursor control option. You drag the file to the trash can and "throw it out."

The second change is that *Deskmate 3* is a two-disk set, with Ledger contained on a separate disk. The program boots by looking at the programs in Program Folder 3. If you are using one disk drive, you have to swap between the two disks for saving files and changing applications. In addition, you are required to set the pathlist, which is a way to tell *DeskMate* what "path" to follow to find programs and save data. This is more important to multiple disk drive users, as *DeskMate 3* defaults to only one disk drive. The remaining programs are in Program Folder 4, which is on the other disk. Instructions for setting the path list to find files or swapping for single drive users are in the manual. Using *Deskmate 3* on a one-drive system means frequent disk swaps and a lot of aggravation. I recommend and strongly suggest you use at least two disk drives.

The Menu Icon Bar feature lets the user access the subfunctions of *DeskMate*: files, printer, calculator, date and time set, display type, cursor control, help, and a "hot key" to get you back to the program you were in last, with whatever file that was open at the time still open. That means you can stop editing a letter in the 40-column mode by exiting to the Icon Bar, switch to 80-column mode, and return directly into your edit file, as OS-9 keeps track of open files for you.

There are several new features here. First, under the printer configuration function you can now set the printer for between 300 and 9600 baud (with *DeskMate* 1.0 you could only choose 600 or 1200 baud). This is actually a feature of OS-9 Level II.

The next new feature is Display. Display for *DeskMate* 1.0 was a choice of black on green or inverse, or white on black with colors (red and blue) or inverse. With *Deskmate 3*, you have a choice of a 40- or 80-column display in Ledger, Text and Telecom. This enhancement gives a WYSIWYG (What You See Is What You Get) display in these three programs. This is an excellent enhancement that takes advantage of the CoCo 3 display capabilities. The CM-8 Analog RGB monitor provides crisp and clear 80-column display. With a medium resolution color composite monitor, the 80-column display is difficult to use, and you may have to use only the 40-column display. With a monochrome monitor, the display can be used in an 80-column format. Results vary substantially with the quality and type of monitor you use.

The best display by far is the RGB. With *DeskMate 3* the user has 16 color choice combinations at any one time. The color is set using a special program with a palette and color scales to select colors for the background, foreground, window borders and command bar. The program is difficult to get used to at first, but after a little familiarity it is easy to set the resolution between 40- and 80-column and to set the colors any way you want.

Neither Calendar nor Filer have been altered significantly from *DeskMate* 1.0. The greatest difference is that Index Cards from *DeskMate* 1.0 has been named Filer in *DeskMate 3*. All files are compatible with the older *DeskMate*, however, and Filer automatically converts Index Card files to the new Filer format.

Text and Ledger have been upgraded to include a choice of either 40- or 80-column screens in each of the programs. You can switch between the screen formats at any time. This enhancement makes a big difference in both Text and Ledger; with Ledger you can see a lot more rows and columns of data and how changes impact the spreadsheet twice again as much as was possible with *DeskMate* 1.0. With Text you have a similar advantage, you get a full 80 columns of text, giving a more realistic idea of what the formatted page will look like when completed. For users with televisions or composite monitors, the 40-column choice is still there. Files are also directly compatible with *DeskMate* 1.0.

Telecom has been improved in several key areas. The first is a choice of either a full 80-column or a 40-column display. This really makes a big difference in communicating with machines that are used to sending 80-column screens. It also means that you don't have to reconfigure for 40 columns every time you call a new computer. It also provides more of a viewing window with the view option to see what information has been received.

A second major enhancement that makes life much easier with Telecom is the Xmodem option. Now users have the choice of using either Xon/Xoff file transfer protocol or Xmodem file transfer. Xmodem makes file transfers much easier, and is more accurate, saving time and money.

The third enhancement is an increase of about 10K in the storage buffer. This is now 23K from 13K in the original *DeskMate* 1.0. Also, the terminal screen has been enhanced and simplified for transmitting and receiving files under a separate option, which makes them easier to utilize while online. Yet another change is that User Keys 8 and 9 have been left undefined, so you can install your own macros instead of being forced to use them for User I.D. and Password.

The Serial Port option must be set at /T2 if you are using the Tandy Multi-Pak interface and an RS-232 program pack; otherwise, you will be unable to access terminal mode.

Paint is another area of *DeskMate 3* that has been greatly enhanced. In combination with the CoCo 3's display capabilities and some program changes, Paint now gives you a 16 color 160-by-200 pixel resolution screen to work with. *DeskMate* 1.0 had four colors and a resolution of only 128-by-192 in four-color mode. With the new Paint, there is only one high resolution mode, and no longer an option for "colors" under the edit menu. There are also less initial patterns. The edit pattern screen, however, has been substantially enhanced to incorporate all 16 colors available to create and edit your own patterns in an 8-by-8 pixel matrix. This screen is operated very similarly to the Display option screen on the Icon Bar.

In addition, several new tools have been added to Paint to assist in the drawing process. These are solid rectangle, solid circle, and rays, which draw lines extending in any direction from a common hub or matrix. I thought the manual could have been a little bit better in introducing the user to Paint in the "Getting Started" section.

This, then, is the new *DeskMate 3* for the Color Computer 3. We have taken a look at the new features, some advantages and some drawbacks to the new software. As an integrated package, this is a full-featured program. As a group of stand-alone products, these programs are limited. As a writer, for example, I need a more full-featured text editing program than Text. For my work at home, however, this product provides the basic functions that I need with the added convenience of all being interconnected by one program.

As many readers might agree, there are other factors besides productivity that influence the view of a product. For a child to learn on, this is an excellent package. For an adult new to computers, this is an excellent product to get the sense of how programs work. For a household, this product is more than adequate to generate notes, draw pictures, keep an inventory or phone list, call the computer at the office, etc. It can best be described as simple, yet sophisticated.

Still another feature is what has been called "user-friendliness." Is the program friendly to you? With *Deskmate 3*, the answer is yes, very friendly and fun to use. It comes with an Intro Pak to Compuserve and a quick reference card to all the commands and features, which make it very easy for the user to get up and running.

The documentation that accompanies *DeskMate 3* is complete and easy to read, and organized better and more thoughtfully than the original *DeskMate* 1.0. Of great value are the many screens and examples, and the "Getting Started" section gets the user up and running in short order.

Anyone in need of an integrated set of programs for the Color Computer 3 should consider *DeskMate 3*. This is a quality software package, and very useful with all its self-contained features and functions.

(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $99.95: Available in Radio Shack stores nationwide.)

— Jeffrey Parker

Software CoCo 1, 2 & 3

CoCo Disk Zapper — A Handy Utility

CoCo Disk Zapper is a handy utility that you can use if you ever have the unhappy experience of crashing a disk, or want to modify a disk file. The program is menu-driven and works on all models of the Color Computer.

The menu options available include:

A) Alphabetize Directory
D) Drive = 0
L) Look at track/sector
Q) Quit
S) Search Disk for string
T) Translate = ON
V) Verify Disk
Z) Zap current track/sector

Most of these options are obvious, but a few bear further explanation.

The Search Disk string option is handy because it finds every track and sector on the disk where a specific string of characters is located, and it displays that information on the screen or to your printer.

The Translate option is provided so that you can view the disk contents in ASCII form. Unfortunately, you can't toggle on and off without first going back to the menu and reselecting the track and sector. If ASCII is on, you can type directly onto the sector. If ASCII is off, you must type on the sector in hexadecimal.

Verify Disk lists all bad tracks and sectors right on the screen, along with the appropriate error message. The arrow keys are used to move the cursor through the tracks and sectors.

CoCo Disk Zapper is a copy-protected program and is sold as is with no warranty, although a program is provided to allow you to make a non-executable backup. I believe Microcom should offer some kind of replacement policy if backup opportunities are to be prevented.

(Microcom Software, P.O. Box 214, Fairport, NY 14450, 716-223-1477; $24.95 plus $3 S/H)

— David Gerald

Software CoCo 3

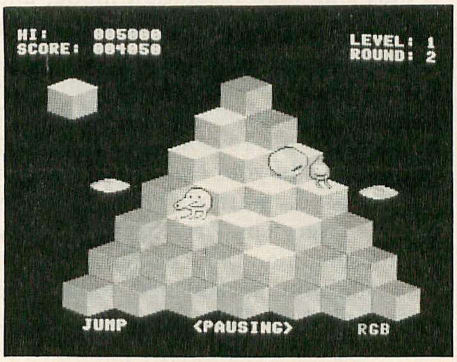
Pyramix — Keeps You Hopping

Pyramix is similar to the old favorite "Q-bert" arcade game. It's a 100 percent machine language program requiring a minimum of 128K RAM. The colors are brilliant, the graphics are razor sharp, and the action is fast and furious. Excellent sound effects are used throughout the program to enhance the animation.

The object of *Pyramix* is simple, and you catch on very quickly as to how to play. All you have to do is hop a short, fat little guy with a long snout, Kubix, on top of the blocks that make up a pyramid on the screen. When Kubix hops on a block it changes color, and the idea is to get all the blocks the same color. When all the blocks match the master cube shown in the upper-left corner of the screen, you advance to the next level.

While this all sounds pretty easy — believe me, it's not. There are many falling boulders to thwart your progress, and contact with a deadly snake costs you a Kubix. As you try to avoid these obstacles and change block colors, you will also notice a little guy the authors call a "punk" with sunglasses. His sole purpose in life is to undo all your hard-earned color changes.

There are six levels of difficulty in *Pyramix*. I was only good enough to get to the second level, but then again, as I get older my coordination seems to diminish. My 10-year-old daughter, however, got to Level 4 with little difficulty. The game can be played with a joystick or with the arrow keys. I really recommend a joystick if you want to accumulate a large score.



I was impressed with the opening title screen and game board that drops down from the top of the screen and "bounces" several times before play begins. The bouncing is very life-like and really shows off CoCo 3's advanced graphics capabilities. The game can be played with either a composite or RGB monitor. I tried it on both but, as you would expect, the colors are more vivid and brilliant on an RGB monitor. A nice feature is the use of a built-in Help screen. A brief encounter with this screen is all you need to be able to play the game, although excellent documentation is provided.

For those who score well, pressing S displays the game high scorers. If you don't press any keys, the game automatically goes into the Demo mode. Watching the demo gives you a few good hints on avoiding many of the obstacles that you will encounter.

A number of objects and characters make up the *Pyramix* game including the likes of Smack, Smuck, Time Stopper, Red Ball, Purple Ball/Kaderf, Elevator Discs, Death Square and Diamond. All of these critters play a big part in your ability to maneuver your Kubix over the pyramid. If you're not careful about which direction Kubix is facing, you will watch helplessly as he falls into oblivion. Scoring is based on your ability to catch Smack or Smuck, the Green Time Stopper Ball, or changing the colors of the blocks as you hop. You also get extra points for completing the various levels of difficulty.

Pyramix is copy-protected and written only for disk systems. Information is provided on how to make a backup copy that can be used to restore the original in case of trouble. The game is provided on both sides of the disk and can be used as a flippy, so you start off with two copies of the program.

I loved *Pyramix*. I believe this program shows off the graphics potential of the CoCo 3 at its best. ColorVenture should be congratulated for an excellent product, and I anxiously await other CoCo 3 developments from them.

(Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228, 502-241-6474; $24.95)

— Jerry Semones

Software CoCo 1, 2 & 3

Inventory Manager — Keeps Stock Records Up-To-Date

The one day businesses dread most is the day inventory must be taken. The tedious time spent in counting each item and noting the quantity can be enough to drive anyone crazy. *Inventory Manager* does not take inventory for you, but it makes the experience less painful.

Inventory Manager is an inventory database that revolves around manufacturer part numbers, a copy of the same program that uses four-character/digit stock numbers you assign, and a converter that changes a file created by one into the other. It also has the ability to create purchase orders.

When starting the program, the user is greeted with a simple graphics screen. Press any key and the program starts. Each time the program is run you are asked for the following information: Have you entered your business address? How many drives are you using? What is your printer baud rate? While I realize that your hardware may change (you buy a better printer or add a second drive), an option on the main menu to configure the program would be far less repetitious.

When you reach the main menu, you can actually begin work. Here you may either create, print or edit the files containing your stock information by selecting the appropriate option. When creating files, it should be noted that each of your suppliers should have his own file, as there is an auto-order routine in effect.

Regardless of the version you use (part numbers or your stock ID), the beginning of each item file contains the supplier name and address. A word of caution: When entering the name and address, do not press the ENTER key until all the information has been entered, i.e., the name and address must be entered as a single line of information. At this point, you begin to define the items by entering the part number or the stock number, the quantity on hand, the auto-order number (when your stock reaches or falls below this number it reminds you to order more), how many you want in stock after the order (the program subtracts the actual from this number to determine how many to order), your cost and the retail cost.

When all the items are defined (you may have a maximum of 200 items in any one file, and up to 22 files per disk), you may edit the file. With this option, you can change any field in a given file, add to or delete from the file, and save the results. Using another menu option, you can add or subtract items sold or received. When your in-stock number falls below the auto-order number, the Purchase Order option prints an invoice to send to your supplier.

The program is really very simple to use. There are a couple of problems, though. The first is with the manual. While I had the luxury of time to figure out how everything works, you might not. The manual is poorly written and has no table of contents to direct the user to specific information. At best, it is difficult reading. The fairly straightforward aspects of the package are explained, but the detailed features are skimmed over.

The second problem seems to be in the support area. The program (in versions for either RS-DOS or JDOS) is copy-protected. There is extensive use of the high-speed poke. If your system does not handle the poke well, the manual instructs you to return the program with a note, and it will be modified for you. I wrote to Forrest Enterprises and after three weeks had not received a response. This does not bode well for customer support.

Overall, the program performs as advertised. But with the apparent lack of support, an ordinarily fine program is left to suffer.

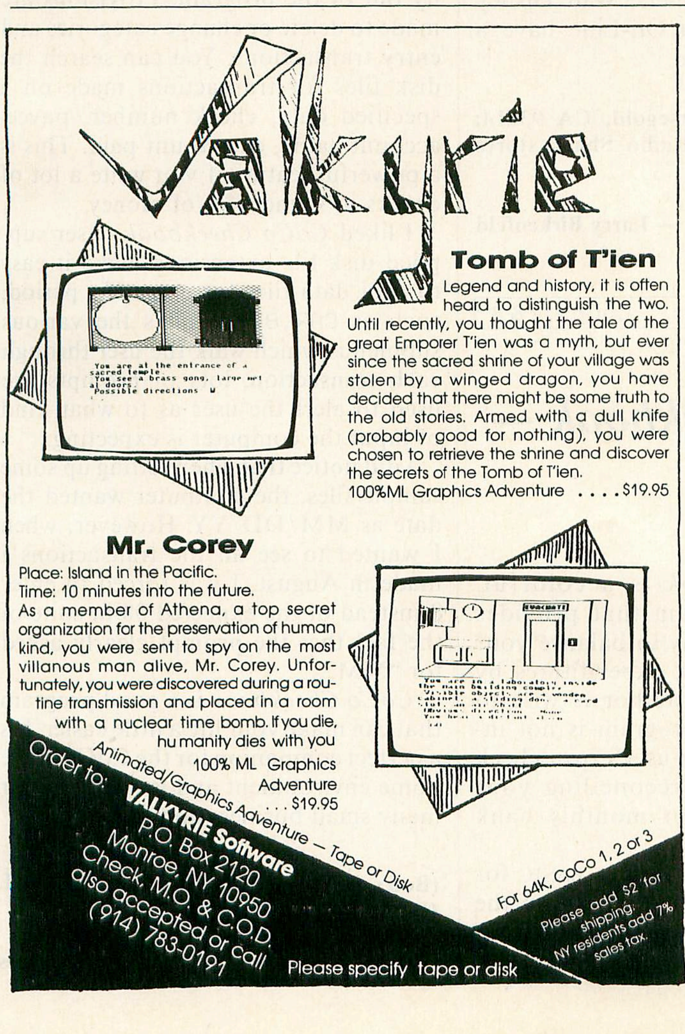
(Forrest Enterprises, 1521 Lancelot, Borger, TX 79007, 806-274-3083; $25: First product review for this company appearing in THE RAINBOW.)

— D.A. Ferreira

Software CoCo 1, 2 & 3

Winnie the Pooh and the Hundred Acre Wood — And Tigger, Too!

Winnie the Pooh and the Hundred Acre Wood is an Adventure game designed for children ages 7 and up. It requires a Tandy Color Computer, one disk drive and at least 64K RAM. Although the game runs under the OS-9 operating system, OS-9 is not required to load or run it. You can use the DOS command in Disk BASIC Version 1.1, or type in a special loader program provided in the manual if you do not have



```
You are at the entrance of a
sacred temple.
You see a brass gong, large met
al doors.
Possible directions  W
```

Tomb of T'ien

Legend and history, it is often heard to distinguish the two. Until recently, you thought the tale of the great Emporer T'ien was a myth, but ever since the sacred shrine of your village was stolen by a winged dragon, you have decided that there might be some truth to the old stories. Armed with a dull knife (probably good for nothing), you were chosen to retrieve the shrine and discover the secrets of the Tomb of T'ien.

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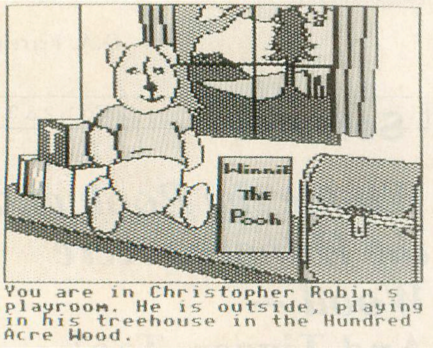
Version 1.1. I have Disk BASIC 1.0 and I also have OS-9 Level I Version 1.1. I tried the special loader program, the OS-9 boot program included with the OS-9 system, and running from within the OS-9 shell itself.



```
You are in Christopher Robin's
playroom. He is outside, playing
in his treehouse in the Hundred
Acre Wood.
```

The special BASIC loader program worked perfectly. It is a short program and very easy to type in, but it must be saved on a disk other than the *Pooh* disk since the *Pooh* disk is in a special OS-9 compatible format. The OS-9 boot program also worked without a hitch.

Pooh comes on a single disk written on both sides in "flippy" fashion. This means you simply turn the disk over to gain access to side two on a single-sided drive. The game boots from side one and then requests that you insert side two to complete the loading process. The instructions call for using a backup copy of the disk. Even though *Pooh* runs under OS-9, you can use the standard `BACKUP` command to create your backup copy. Unless you have access to a flippy disk, the backup requires two disks.

The manual begins with a short story about Pooh and his walk through the Hundred Acre Wood. Pooh finds that many of his friends have lost some object. It is up to him to find these objects and return them to their proper owners.

There are a total of 10 objects scattered throughout the woods. Pooh begins his search from Christopher Robin's playroom and proceeds into the woods looking for the missing objects. Once an object is found, Pooh must return it to its proper owner or location in the woods. For instance, a lost picnic basket belongs under an empty picnic table.

Excellent graphics are used throughout the game showing scenes in the woods. Stories are given describing each scene along with a list of things Pooh can do. There are usually several choices that describe something Pooh may do, or he may select North, South, East or West. Using these choices Pooh can search the woods for all the missing objects and their owners.

When an object is found, a "take" choice is provided. When already carrying an object, a "drop" choice is displayed. Pooh can carry only one object at a time and when he drops an object, he is informed whether or not he has found the correct owner.

Every now and then Tigger bounces in and causes Pooh to lose what he is carrying. A wind may also blow in and mix everything up in the woods again, confusing poor Pooh. If Pooh is not careful, he may get lost in the mist and cannot see anything. When this happens all he can do is keep walking until he is out of the mist, but no telling where he will be by then.

If Pooh needs help finding out where the object belongs, he may take it to wise Mr. Owl and receive a clue as to the proper owner. However, Pooh must still locate the owner's whereabouts himself.

All in all, *Winnie the Pooh in the Hundred Acre Wood* is a very exciting game for young and old alike. The graphics are excellent and children learn how to create and read maps and charts to assist them in locating the objects and their owners. Walt Disney Software and Sierra On-Line have a real winner in *Winnie.*

(Sierra On-Line, Coarsegold, CA 93614; $34.95. Available in Radio Shack stores nationwide.)

— Larry Birkenfeld

Software

CoCo 1, 2 & 3

CoCo Checkbook — Keeps You in Balance

CoCo Checkbook is a colorful, menu-driven program that provides you with an easy way to balance your checkbook and track expenditures by category. While the author is wise to point out that the program is not intended to replace the user's own check register, it aids in reconciling your checkbook with your monthly bank statement.

The program is written in BASIC for a minimum of 16K and works on the CoCo 1, 2 and 3. It is supplied on disk, and is not copy-protected. Documentation consists of a detailed 49-page notebook that includes seven sample sessions used to acquaint the user with loading, operation and file manipulation.

The maximum number of transactions allowable is 1,500 using a single disk drive or 2,200 with two drives. The user can establish 64 different account names, making it easy to keep track of expenses by categories such as food, clothing, gasoline, house payments, entertainment, etc. The program accepts check numbers from 0 to 9999. The maximum value for a single transaction is $9,999.99, or an accumulated total of $99,999.99.

CoCo Checkbook is designed to allow input of automatic bank deposits, teller machine transactions, and cash transactions. Budgeting is accomplished by setting aside funds to meet periodic payments. These funds, while not appearing in your checkbook register balance, are included when your statement balance is computed. Since each budgeted account is maintained separately, the balance in each category can be established at any time.

A printer is optional; however, I recommend one to get the most flexibility out of the program. Provisions are made to delete or change categories and entry transactions. You can search the disk files for transactions made on a specified date, check number, payee, account name, or amount paid. This is a powerful feature if you write a lot of checks or spend a lot of money.

I liked *CoCo Checkbook.* User supplied disk file extensions make it easy to spot data files for a specific period, such as `CAR.87`. Besides the various submenus which walk the user through each transaction, lots of prompts are used to alert the user as to what kind of input the computer is expecting.

I did notice that when setting up some sample files, the computer wanted the date as MM/DD/YY. However, when I wanted to see all the transactions I made in August, I was forced to enter 8 instead of the expected 08 in spite of the fact that the prompt clearly asked for "MM."

CoCo Checkbook is a good program that can make your life a little easier. It's a perfect companion for the CoCo in the home environment and is adequate for many small business applications.

(Bob's Software, P.O. Box 391, Cleveland, OH 44701, 216-871-8858; $25)

— Jerry Semones

Caladuril Flame of Light — A Different Kind of Adventure

Caladuril Flame of Light is different from any Adventure game I have played in the past. Instead of using the standard North, South, or N, S, or go N, go E, etc., you use the arrow keys to move. While this may not be unique by itself, this and the graphics that go along with it make it different.

The screen is split into sections. The top-left quarter, called the Play Field, is used for the graphics and lets you see where your character, Jame, is and the adjoining terrain. The bottom half is like the standard Adventure game area. This is where you see the text from the Adventure and where you type in the commands to manipulate objects.

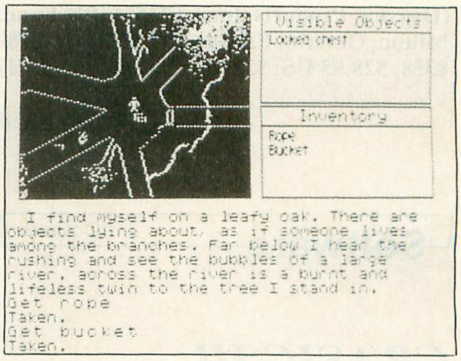
The top-right quarter of the screen is split into two parts. The top part, titled Visible Objects, is used when you move up close to an object. The object name is listed. If your monitor does not make it clear what the object is, this makes identification much easier.

The bottom is titled Inventory and is just that. This is very nice since, at a glance, you always know what you are currently carrying. If your screen is so bad that even the writing in these two areas is illegible, you can type `VIEW` or `INVENT` to have that area printed on the lower half of the screen.

As in all Adventure games, a map is helpful, and it is always advisable to save your game often. *Caladuril* allows you the option of saving only one game. But all good Adventurers can overcome. To play *Caladuril,* you use the Boot disk to start, and insert a Player disk to play. While the boot disk is copy-protected, it is recommended to make a backup of the player disk. So, make a couple of backups of the player disk and save the game in multiple stages.

You must have a player disk in the drive as you play the game since it occasionally goes to the disk to load pictures and data about the new areas, but any player disk will do this. You can put in a new player disk anytime you want to save the game at the new location.

Caladuril has a Restart command that protects you. Typing `RESTART` after you load a game puts it back to the nearest non-critical point. At this point the game can be won. You may use Restart at any time during the game, so you could use it to try different solutions to the same problem.



```
Visible Objects
Locked chest

Inventory
Rope
Bucket

 I find myself on a leafy oak. There are
objects lying about, as if someone lives
among the branches. Far below I hear the
rushing and see the bubbles of a large
river, across the river is a burnt and
lifeless twin to the tree I stand in.
Get rope
Taken.
Get bucket
Taken.
```

The documentation states that the program requires a Color Computer with 64K and a disk drive and that it also runs on a CoCo 3. It did run on my CoCo 3 just like my CoCo 1, almost. While the play and look of the game was the same on both machines, *Caladuril* was compatible with ADOS on my CoCo 1, but it was not compatible with ADOS 3. I had to throw my trusty little

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switch to go to Radio Shack DOS. The `Fast` command puts the CoCo 3 in the double-speed mode and `Slow` returns it. These commands are ignored by the CoCo 1 and 2.

I really enjoyed *Caladuril Flame of Light*, but I have to admit, I did not solve it.

(Diecom Products Inc., 6715 Fifth Lane, Milton, Ontario, Canada L9T 2X8, 416-878-8358; $28.95 US; $38.95 CDN plus $2 S/H)

— Dale Shell

Software

CoCo 3

CBASIC III — Power for Programmers

CBASIC III is a complete editor/compiler programming system for the Tandy Color Computer 3. By implementing all standard BASIC statements, including the new Hi-Res commands, complemented with an excellent text editor, and topping it all with an efficient compiler, Cer-Comp has given CoCo 3 BASIC programmers a powerful tool.

Just what is a compiler, anyway? A compiler converts BASIC code into machine language, creating programs which are accessed by `LOADM` and `EXEC`. The main advantage to this format is extra speed of execution. The Color BASIC which comes built into the CoCo 3 is in the form of an interpreter. As each BASIC line of code is encountered, it is "interpreted," then converted to binary code which implements the instructions on a line-by-line basis. A compiler, on the other hand, pre-converts the BASIC code into pure machine language, thus allowing the resulting binary code to skip the repeated need to interpret each line. This results in much faster instruction execution.

CBASIC III has gone this one better by adding many additional BASIC commands to the programmer's repertoire, and has added a more powerful text editor to assist in writing and debugging BASIC code.

The program comes on a single copy-protected disk, along with a well-written manual. Users can back up the original disk, but the copy is not executable. It is kept aside to be available for restoration of the original, should it ever become unusable. The manual is neatly done, featuring a spiral binder, a handy feature for keeping your place when working.

When *CBASIC III* is loaded, the editor is automatically active. It has not only the standard BASIC editing commands, but some added features as well. Some of these are quite powerful. For example, `SEARCH`, as suggested by the name, searches through the program for a given string. `RPLACE` replaces a given string with another. Key repeat is implemented and the repeat speed controlled with `RDELAY`. Characters per line can be altered with `SW` (Set Width). Many more editing commands, such as `LEDIT`, `AEDIT`, `PRINTER`, `SIZE`, `BRATE`, `LF`, `CCOLOR`, etc., have also been added. Programming commands have not been overlooked and quite a few interesting ones are added. Some, like `SWAP$` (a handy one) and `GEN` (allows ML instructions to be directly inserted) are so powerful you will wonder why they weren't there in the first place. Others include `HIRES`, `UNLINK`, `CBLINK`, `SIGN`, `ON INTERUPT`, `IRQ`, `LPOKE`, `DLPOKE`, `RAM`, `CHAIN`, etc. Access is afforded to a full 512K of memory. There is no need to go into detail as to particular functions in this review. Suffice it to say that they are of value, and are fully documented in the accompanying manual. Once edited, programs are saved in an ASCII format, with the extension `/CBA` automatically appended.

After the code is saved, compiling can safely take place. Starting the compile process is as simple as typing `CBASIC` *program name*. As the program compiles each line, errors are highlighted for ease of further editing. Output of the line-by-line error checking can be directed to a printer for maximum convenience in further editing. The resulting code is automatically saved with the `/BIN` extension. Assuming all errors have been corrected, this code can be loaded with the `LOADM` command, just as any other `/BIN` program.

There are some differences between Color BASIC and *CBASIC III*. For one, the dimensioning of strings (`DIM`) is handled differently by *CBASIC III*. Variable initialization to particular values is also needed. Don't worry about that, the author shows you a shortcut. Most command syntax remains identical to the Color BASIC version.

Like most of us with a new program, I couldn't wait to get started with this review. I quickly saved a couple of my own BASIC programs in ASCII format and tried compiling them. Much to my amazement, I had them compiled and working just fine in only a few minutes. Don't get me wrong — this does not happen every time. To fully utilize a program with this power, you have to read and maybe reread the manual. Most of the problems I did encounter turned out to be just a matter of my not following instructions.

In summation, I would say that Cer-Comp has created a real winner with *CBASIC III*. As a CoCo user since the days of 4K and a tape drive, I am always anxious to try out the latest in CoCo hardware and software. Over the years, few products have impressed me as much as this one. Simply put, *CBASIC III* is an all-around excellent package.

(Cer-Comp, 5566 Ricochet Avenue, Las Vegas, NV 89110, 702-452-0632; $149)

— Leonard Hyre

Software

CoCo 3

CoCo Max II Patch — CoCo 3 Helper

CoCo Max II Patch is a set of powerful new programs from ColorVenture that allow owners of *CoCo Max II* to use this popular program on their CoCo 3. This is done with the use of Tandy's Hi-Res Joystick Interface (Cat. No. 26-3028) that sells for $9.95 at Radio Shack stores nationwide.

Not only can you use *CoCo Max II* on your old Color Computer with the Colorware Hi-Res Joystick Interface Pack, you can use it on your CoCo 3 with the simple addition of the Tandy Hi-Res Interface. With this approach, you don't even need the Multi-Pak Interface or a Y-cable, and you can access 256-by-192 pixels using a joystick, mouse or X-pad. One word of caution: You have to use either an RGB monitor capable of color composite video, a color composite monitor or a color TV, since the Tandy CM-8 does not display artifact colors. If you use these patches for *CoCo Max II* with your CoCo 3 and CM-8 monitor, you will get pictures in black and white.

The disk contains patches for *CoCo*

Max II, Max Edit and a program called *HJOYSTK*. The patches are very simple to install. A new file, `NEWMAX`, results and is used to run the patched *CoCo Max II* program on your CoCo 3. A direct patch is provided for *Max Edit* if you have it and is run just like before with `RUN "MAXEDIT"`. In both cases, you are instructed to make a backup copy of your original disks before you attempt either of the patches. The *CoCo Max II* patch program disk is not copy-protected, so backup copies for your protection are recommended.

The third program on the disk, *HJOYSTK*, is a Hi-Res Joystick Interface driver that provides a way to access all 640-by-640 pixels available on the CoCo 3 from your own BASIC or machine language programs. This is a handy utility program that can be used to support the Tandy Hi-Res Joystick Interface used with not only your joystick, but with a mouse or X-pad as well. A demo program is supplied that demonstrates the use of *HJOYSTK*.

I liked *CoCo Max II Patch*. It was simple to install the two patches and *CoCo Max II* worked fine on my CoCo 3. I was able to load, view and edit many of my old *CoCo Max II* pictures with no problem.

(Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414, 718-835-1344; $24.95 plus $3 S/H)

— Michael Beckman

Software CoCo 1, 2 & 3

QuikPro+II — Writes Databases for You

I have often heard the old cliche, "Seeing is believing," and sometimes you really do have to see to believe. This is a case in point.

Several months ago, I received in the mail an advertisement from ICR FutureSoft offering to sell me a $149 program called *QuikPro+II* for the small sum of $29.50. With such a price drop a few "flags of doubt" arose in my mind. But what really raised those flags to a level of rejection was the advertisement's claim that this was a piece of software that would write programs for you, and you didn't even have to know how to program the computer. I figured that this was just too good to be true and threw the advertisement away.

A few months later, lo and behold, here comes a review package from RAINBOW with that very piece of software in it. So, OK, we now have a way to really test the advertising claims.

The packaging of *QuikPro+II* was really impressive. It came in a nice vinyl case and contained an 80-page instruction manual. I really didn't see how they could even put out this sort of package for such a small sum. So the "catch" must be that there's something wrong with the software — right? Wrong!

I scanned the manual for enough information to get the program up and running. The purpose of *QuikPro+II* is to write programs that will set up and allow input and maintenance of databases. Following the instructions in the manual and the onscreen prompts, I set up a screen of data input fields for a

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R.A.D. Products Presents TEXTFORM

Finally, a versitile text formatter is available for the Color Computer. TEXTFORM is compatible with all models with at least 64K, even the Color Computer III. This machine language program will format ASCII text files into two column pages quickly and easily. Text may be left unmodified, or simply insert special formatter commands for added control. TEXTFORM is a versitile enhancement to any word processing system whether you are a casual or professional user.

Software supports:
- Output to printer or disk
- Most popular printers
- Adjustable format parameters
- Columnar data
- Multiple page titles
- Optional page numbering
- Large files (up to a full disk)

TEXTFORM comes with complete documentation as well as sample format examples. Onscreen parameter display takes the guesswork out of format settings. Customized parameters may be saved to disk and reloaded for future use, thus eliminating mistakes and configuration time. Special printer codes and baud rate settings are software selectable. TEXTFORM is programmed in a high resolution environment which incorporates pull-down menus for ease of use. The software also supports auxilliary peripheral input from joysticks, mouse, touchpad, and high resolution input pack for added program control.

This is not another word processor. There are many fine word processors on the market for the Color Computer. TEXTFORM is a user defineable two column text formatter. If you are looking for a program which will allow your Color Computer to create professional looking documents without hours of tedious work, then TEXTFORM is the answer.

Ideal for:
- School newspapers
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System requirements:
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Express shipping available by request

program to maintain employee records of a mythical company. Even with my constant referral to the manual, it only took a few minutes. Then I pressed a key and a message came on the screen to tell me that my program was being written for me. I had not entered a single line of programming. After a few more minutes, a message came on the screen to tell me that my program was reading and asked if I wanted a hard copy printout.

QuikPro+II had done exactly what it said it would — write a five-page, tightly-packed BASIC program that I could run like any other BASIC program to create a database for maintaining employee records. It was unbelievable! But the software doesn't stop there. There was more, a lot more.

QuikPro+II also asked if I wanted a user's manual to go along with my new program. Not only did it write the program, it wrote the documents to go along with it.

Further study of the *QuikPro+II* manual indicated that the program will sort the records for you, if desired, and that you could even make some of the data input fields "calculation" fields. That is, fields that can be mathematically manipulated. I am absolutely amazed at what this program can do, and I had thrown the original advertisement offer away.

Needless to say, I was extremely curious as to how this piece of software could do what it does, so I immediately dove into it. The disk contains 11 files. All are ASCII BASIC or text files. The version I was working with was designed for the CoCo 1 or 2, one disk drive, and a 32-by-16 screen. However, it does run on the CoCo 3; it just won't take advantage of the CoCo 3's expanded potential, i.e., 80-by-24 column screen. What the programmers of *QuikPro+II* have done is to very cleverly take advantage of the file merge functions of ASCII files. (This, of course, does cost a little in time for the slower ASCII program loads, but once your program has been written, it can be saved back to disk in the faster loading compressed or binary BASIC format).

By using this merge function, most of the final program can already be written, and it is only a matter of taking what is needed to complete the user's created program. This goes for the newly-written program's user manual as well.

One of the promises *QuikPro+II* makes, and it carries it out very well, is that your new program will be highly commented with remark statements. They, likewise, follow this same practice with their own programs. Now ordinarily, a program written in BASIC, particularly in ASCII BASIC, with a lot of remark statements, is extremely slow, a big disadvantage. In the case of *QuikPro+II*, while it is slow to load, it does not seem to suffer any from a lack of speed in operation. And for the CoCo 3 user, the disadvantages of this highly commented ASCII BASIC program turn out to be a real big advantage.

Because of the consistency in program design and the use of fairly standard BASIC, *QuikPro+II* can easily be modified to take advantage of the 80-by-24 screen size of the CoCo 3. There are even places in the program already set up for "error traps," (a function not supported on the CoCo 1 or 2). Most of the modifications only have to do with increasing the size of set variables having to do with screen size and the like.

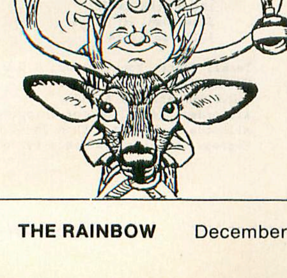
In fact, the only disadvantage of the *QuikPro+II* system is the hardware limitation of the CoCo 1 and 2 32-by-16 screen. Part of this screen must be used by the program for prompts and line guides, so this limits the number and size of the data fields that can be designed and utilized. Other than that one small disadvantage, I must say that this is one of the best programmed pieces of BASIC software that I have seen.

After working with *QuikPro+II* for this review, I am now sorry that I did not respond to the original advertisement mailer. Seeing what the program can do made a believer out of me.

(ICR FutureSoft, P.O.Box 1446-FC, Orange Park, Fl 32073, 800-872-8787; $29.50 plus $4.50 S/H)

— Kerry Armstrong

Happy Holidays!



Software CoCo 3

MLBASIC — Create Machine Language Programs

MLBASIC is an enhanced BASIC compiler written for the 128K CoCo 3 with Radio Shack DOS. It is a full compiler that features most of the commands available with Extended Disk BASIC, but added commands in *MLBASIC* make it easy to interface programs with assembly language and other BASIC programs. Best of all, *MLBASIC* allows CoCo 3 users who are not familiar with machine language programs to create them from their BASIC listings with ease. Default options are provided at the menu level and make first-time users feel at ease.

MLBASIC is provided on disk only and comes with a comprehensive 172-page, spiral-bound user's manual. The disk is not copy-protected, so you can make a backup copy for safekeeping. The program is very easy to use and, as already mentioned, menu-driven. Since it's for the CoCo 3, the menu is done in 80-column format with red and white letters on a black background. The user simply steps through the menu prompts and selects such items as whether or not the program to be compiled is in memory or on disk, filenames to be used, etc. Since the compiler actually translates your BASIC or source program into a new object file, it can be relocated and executed where it is, as opposed to the file being interpreted one line at a time as in BASIC. *MLBASIC* also optimizes the program, thus increasing operating speed.

I tried *MLBASIC* on several of my BASIC programs and was impressed with the obvious increased speed. The authors claim typical increases of 10 to 20 percent but it looked more like 50 percent to me.

The user's manual contains step-by-step instructions and lots of examples. It supports virtually all RS-DOS commands and has added some of its own. Numerical error codes are used (and explained in the user's manual) to flag programming faults.

MLBASIC is a fine program for any serious programmer.

(WasatchWare, 7350 Nutree Drive, Salt Lake City, UT 84121, 801-943-6263; $59.95 plus $4 S/H)

— David Gerald

Received and Certified

RAINBOW CERTIFICATION SEAL

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

◆ **ADDRESS**, a program that automatically addresses envelopes using any two addresses in the proper formatted position. Fifteen files hold 18 records per file for a total of 270 addresses. For the CoCo 3. *RJF Software, RR #2, White Lake, Ontario, Canada K0A 3L0, (613) 623-7824; $14.95 plus $3 S/H.*

BTU Analysis 3.0, an upgrade version that includes disk I/O and automatic lowercase switching within the program. It also fixes bugs found in Version 1.0.0 and 2.0.0. For the CoCo 1, 2 and 3. *A to Z Unlimited, 901 Ferndale Boulevard, High Point, NC 27260, (919) 882-6255; $39.95 plus $3 S/H.*

CAIS Version 2.0, a checking account information system that is menu-driven. This disk-based application is designed to make the task of managing checking accounts easier and faster. For the CoCo 1, 2 and 3. *After Five Software, P.O. Box 21095, Columbia, SC, (803) 788-5995; $34.95 plus $2.50 S/H.*

CoCo 3 OS-9 Ramdisk Package, a package that includes the device driver and descriptor necessary to implement a RAM disk under OS-9 Level I or II on a CoCo 3. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; $29.95 plus $3 S/H.*

Color Max III Font Editor, a program that allows you to design and edit your own character sets. For the CoCo 3. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; $29.95; Font Disk #1, $19.95; both $39.95 plus $3 S/H.*

◆ **Home-Pac**, a home financial package that lets you fill 51 to 80 characters per line with current credit card expenses and totals added to categories. For the CoCo 1, 2 and 3. *Computer Villa, 1328 48th St., Des Moines, IA 50311, (515) 279-2576; $39.95 plus $3 S/H.*

◆ **How to Build Your Own Video Arcade Game**, an instruction booklet on how to rebuild a video arcade game using your CoCo 1 or 2. Also included is a disk that contains four games. *R.A.M. Electronics, 814 Josephine Street, Monmouth, OR 97361, (503) 838-4144; $29.95.*

OS-9 Level Two Development System, a system that includes an interactive debugger; a screen-oriented text editor; a relocating macro assembler; three utilities: Make — to help maintain current version software, Touch — to update files, and VDD — a Virtual Disk Driver/RAM Disk Driver to create high-speed storage in your system's RAM; twelve additional OS-9 commands to expand your system's capabilities. For the CoCo 3. *Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76012; $99.95. Available in Radio Shack stores nationwide.*

◆ **Superbrush**, a tool for home or office that contains one Superbrush with a coarse grade FybRglass refill installed, and two extra refills made of stainless steel wire and fine grade FybRglass. May be used for removing rust spots, cleaning electrical contacts, and roughing surfaces before using epoxy or glue, etc. *The Eraser Company, Inc., Oliva Drive, Syracuse, NY 13221, (315) 454-3237; $6.98.*

◆ **SYNTRAX 2.00**, a 64K sequencer that becomes the control center of your Musical Instrument Digital Interface studio, with the ability to control multiple music synthesizers, rhythm machines or other MIDI devices. Included is a demo disk with four pre-programmed scores. For the CoCo 2 and 3. *Intercomp Sound, 129 Loyalist Avenue, Rochester, NY 14624, (716) 247-8056; $95 plus $3 S/H.*

◆ **First product received from this company**

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW. The "Rainbow Scoreboard" is now a bimonthly feature.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.

★ Current Record Holder ● Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)

3,975	★David Schaller, Clarkston, WA
3,960	Maurice MacGarvey, Dawson Creek, British Columbia
3,960	Robbi Smith, Helena, HI
3,800	Shaw Muniz, Los Angeles, CA
2,600	John Fredericks, Kalkaska, MI
2,450	Blain Jamieson, Kingston, Ontario

BEE ZAPPER (THE RAINBOW, 9/87)

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BIOSPHERE *(Radio Shack)*

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21,372	Randall Edwards, Dunlap, KS
14,186	David Spalding, Galena Park, TX
10,056	Carlos Gameros, El Paso, TX
3,822	Kevin Hilton, Gurdon, AR

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8,859	Darrell Gilpin, Norwalk, CA
7,448	Philip Manwarren, Harrington, ME
3,994	Louis Bouchard, Gatineau, Quebec
1,561	Lise Nantel, L'Acadie, Quebec

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982-0	●Geran Stalker, Rivordalo, GA
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814-0	●John Licata, Richton Park, IL
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89	Milan Parekh, Fullerton, CA
89	Andrew Urquhart, Metairie, LA
89	Steve Zemaitis, Howell, MI
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28,780	Daniel Streidt, Cairo, Egypt
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77,254	Tom Audas, Fremont, CA
73,346	Jean-Francois Morin, Loretteville, Quebec
70,142	Chris Goodman, Baltimore, MD
68,142	Cooper Valentin, Vavenby, British Columbia
67,721	Keith Yampanis, Jaffrey, NH
62,442	Eddie Lawrence, Pasadena, Newfoundland
55,300	Patrico Gonzalez, Buenos Aires, Argentina
49,500	Danny Perkins, Clifton Forge, VA
43,502	Mike Ells, Charlotte, MI
41,896	Antonio Hidalgo, San Jose, Costa Rica
40,360	Jesse Binns, Phoenix, AZ
34,424	Andrea Mayfield, Melbourne, FL
25,147	Timothy O'Neal, Commerce, TX
21,527	Scott Godfrey, Nashua, NH
19,835	Christopher Heston, Louisville, KY
18,251	Sam DiCerce, Willowich, OH
18,103	Sarah Van Oteghem, Taylor Ridge, IL
17,120	Kay McCluskey, Remsen, NY

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224/358	Joseph Delaney, Augusta, GA
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45,425	★Talib Khan, Bronx, NY

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3,505	Blake Cadmus, Reading, PA

GALACTIC ATTACK *(Radio Shack)*

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9,930	Daniel Streidt, Cairo, Egypt

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249,960	Matthew Fumich, Munford, TN
169,410	Danny Dunne, Pittsfield, NH
149,520	Vernon Johnson III, Parkville, MD
116,280	Scott Jamison, Billerica, MA
116,000	Micah Clough, Houston, TX

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10,222,940	Clinton Morell, Sacramento, CA
10,020,500	Ken Hubbard, Madison, WI
7,493,340	Stirling Dell, Dundalk, Ontario
2,626,950	Jonathon Ross, Pocomoke City, MD
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2,312,640	Rory Kostman, Hershey, NE
2,115,790	Jerry Honigman, Waggoner, IL
2,011,200	Jerry Colbert, Bakersfield, CA
1,108,750	Robert Fox, Dover, OH
1,094,280	Donnie Pearson, Arvada, CO
1,081,530	Michael Wallace, Bronx, NY
1,025,900	John Hotaling, Duanesburg, NY
1,016,050	Edward Swatek, Chicago, IL
933,740	Yvan Langlois, Laval, Quebec
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79,570	David Gordon, Pierre, SD

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252,840	Edward Rocha, Cobleskill, NY

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318,160 Jeremy Pruski, Sandwich, IL
137,920 Mike Grant, Fresno, CA
127,550 Michael Heitz, Chicago, IL
120,670 Vernon Johnson III, Parkville, MD
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MOON HOPPER *(Computerware)*
103,840 ★Alphonse Brown, Houston, TX
51,870 Martin Kertz, Forrest City, AR
MUDPIES *(MichTron)*
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MUNCHKIN BLASTER (THE RAINBOW, 8/87)
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7,240 Jeff Remick, Warren, MI
NUKE AVENGER *(T&D Software)*
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1,210-0 ●Gregg Thompson, Chesterfield, VA
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199,000 ★Sean Noonan, Green Bay, WI
PITSTOP II *(Epyx)*
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54 ★Jeff Coburn, Easton, PA
54 ★Walter Hearne, Pensacola, FL
54 ★Sean Noonan, Green Bay, WI
51 Christian Grenier, Valleyfield, Quebec
49 Randy Venable, Coal City, WV
9 Laundre Clemon, Sacramento, CA
POLARIS *(Radio Shack)*
161,198 ★Danny Remick, Warren, MI
POLTERGEIST *(Radio Shack)*
4,855 ★Darcy Gifford, Portland, OR
4,080 Alphonse Brown, Houston, TX
POOYAN *(Datasoft)*
99,500,300 ★Danny Wimett, Rome, NY
97,500,000 Rich Fiore, Clemson, SC
54,500,000 Carlos Gameros, El Paso, TX
3,785,000 Ben Collins, Clemson, SC
1,987,000 Jon Sowle, Sanford, FL
POPCORN *(Radio Shack)*
94,470 ★Patrick Martel, Laval, Quebec
PYRAMID *(Radio Shack)*
220 ★Jason Ebbeling, Berkshire, MA
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QUIX *(Tom Mix)*
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1,404,000 Curtis Goodson, Sao Paulo, Brazil
1,003,104 Elisa Goodson, Sao Paulo, Brazil
205,335 John Hotaling, Duanesburg, NY
104,034 Christopher Conley, North Attleboro, MA
RADIO BALL *(Radio Shack)*
6,330,350 ★Myriam Ferland, Trois-Rivieres, Quebec
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1,768,940 Brian Buss, Whitehall, PA
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2,100 ★Dave Allessi, Iselin, NJ
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RETURN OF JUNIOR'S REVENGE *(Colorware)*
1,792,800 ★Chad Presley, Luseland, Saskatchewan
ROGUE *(Epyx)*
27,542 ★Melanie Lapoint, Fitchburg, MA
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5,369 John Moore, Ottawa, OH
5,274 Reland Brumfield, LaJolla, CA
4,719 Mary Calcott, LaJolla, CA
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332,600 ★Jeremy Carter, Spring Lake Park, MN
SANDS OF EGYPT *(Radio Shack)*
82 ★Edward Rocha, Cobleskill, NY
86 Roy Grant, Toledo, OH
87 Neil Haupt, Elyria, OH
SAUCER DEFENSE (THE RAINBOW, 4/87)
30,900 ★Jason Ebbeling, Berkshire, MA
SHOOT'N RANGE (THE RAINBOW, 8/87)
5,433 ★Benoit Landry, Drummondville, Quebec
SHORT-TERM MEMORY TEST (THE RAINBOW, 12/85)
20 ★Brian and Harold Matherne, Gretna, LA
SLAY THE NERIUS *(Radio Shack)*
73,091 ★Jeff Remick, Warren, MI
SPACE AMBUSH *(Computerware)*
250,000 ★Roger Spackman, Gaspe, Quebec
SPEED RACER *(MichTron)*
148,050 ★Alan Martin, Cornwall, Ontario
130,720 Patricio Gonzalez, Buenos Aires, Argentina
SPEEDSTER (THE RAINBOW 8/87)
3,350 ★Jamie Stoner, Mt. Union, PA
SPIDERCIDE *(Radio Shack)*
6,170 ★Talib Khan, Bronx, NY
3,820 Eddie Lawrence, Pasadena, Newfoundland
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1,160 Jason Ebbeling, Berkshire, MA
STARLORD (THE RAINBOW, 8/86)
10,489,710 ★Frederick Lajoie, Nova Scotia, Canada
STELLAR LIFE-LINE *(Radio Shack)*
629,000 ★Steven Smith, Matthews, NC
114,620 Martinez Domingo, Miami, FL
SUCCESS MANSION (THE RAINBOW, 1/87)
13/13 ★Dave Allessi, Iselin, NJ
SUPER ROOTER (THE RAINBOW, 5/86)
15,180 ★Richard Donnell, Penns Grove, NJ
11,090 Frederick Lajoie, Nova Scotia, Canada
3,910 Daniel Bradford, Birmingham, AL
TEMPLE OF ROM *(Radio Shack)*
303,600 ★Tim Hennon, Highland, IN
TIME BANDIT *(MichTron)*
89,650 ★Sarah Rollin, San Bruno, CA
48,990 Andrew Rollin, San Bruno, CA
TREASURE QUEST (THE RAINBOW 11/86)
645,360 ★Stephane Martel, Laval, Quebec
TREKBOER *(Mark Data)*
132 ★Matthew Fumich, Munford, TN
123 Roy Grant, Toledo, OH
TUT'S TUMB *(Mark Data)*
118,720 ★Reina Roy, Carleton, Quebec
72,000 Chad Presley, Luseland, Saskatchewan
60,020 Don Siler, Muncie, IN
45,000 Blake Cadmus, Reading, PA
VARLOC *(Radio Shack)*
2,032 ★Tony Harbin, Cullman, AL
2,032 ★Edward Rocha, Cobleskill, NY
2,008 Philip Puffinburger, Winchester, VA
1,995 Denise Rowan, Minneapolis, MN
1,988 Randall Edwards, Dunlap, KS
1,975 Bernard Florence, Croydon, Australia
VICIOUS VIC (THE RAINBOW, 7/86)
18,813 ★Talib Khan, Bronx, NY
10,489 Karl Gulliford, Summerville, SC
6,294 Pat O'Neill, Nepean, Ontario
4,643 Martha James, Swarthmore, PA
3,285 Richard Donnell, Penns Grove, NJ
THE VORTEX FACTOR *(Mark Data)*
100/276 ★Tommy Crouser, Dunbar, WV
100/483 Rick & Brenda Stump, Laureldale, PA
210 Paul Maxwell, Vancouver, British Columbia
WARP FACTOR X *(Prickly-Pear)*
5,829,559 ★Doug Lute, Clymer, PA
WILDWEST *(Tom Mix)*
38 ★Neil Haupt, Elyria, OH
WRESTLE MANIAC *(Diecom)*
956,971 ★Marc Reiter, Cincinnati, OH
546,315 Louis Bouchard, Gatineau, Quebec
45,483 Tony Bacon, Mt. Vernon, IN
39,086 Billy Helmick, Independence, KY
26,599 Jonathon Ross, Pocomoke City, MD
ZAKSUND *(Elite Software)*
39,950 ★Walter Hearne, Pensacola, FL
ZAXXON *(Datasoft)*
2,061,000 ★Byron Alford, Raytown, MO
1,950,000 Blake Cadmus, Reading, PA
1,300,500 Dan Brown, Pittsford, NY
1,100,600 Andrew Urquhart, Metairie, LA
253,400 Bob Dewitt, Blue Island, IL
170,600 Matthew Yarrows, East Hampton, MA
163,700 Daniel Bradford, Birmingham, AL
119,600 Daniel Streidt, Cairo, Egypt
118,100 Upton Thomas, Arnold, MD
111,400 Jeff Miller, Bronson, MI
87,200 Tim Lang, Downieville, CA
83,700 David Darling, Longlac, Ontario
81,000 David Anderson, Midlothian, VA
ZONX (THE RAINBOW, 10/85)
6,500 ★Daniel Streidt, Cairo, Egypt
ZUES *(Aardvark)*
3,380 ★Martin Kertz, Forrest City, AR

— **Jody Doyle**

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, which appears bimonthly, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

In response to questions from:

- Jaan Laansoo: In *Sands of Egypt*, the torch can be found by going to the snake, then going west twice, south once, east once and then digging.

- Brien Louque: In *Sands of Egypt*, you can get the water after oiling the scepter and getting and emptying the canteen. To do this, ride back to the oasis, fill and get the canteen. Then type `DRINK`.

- Anne Fiehler: I hope you tied the boat to the pole in *Sands of Egypt*! If you did, don't try to get the treasures. Go to the crack and get your supplies. Go to the archway, untie the rope and look up. Drift until you see a hole in the roof, then drop and climb the ladder. Then feed, mount, ride and dismount the camel.

David Rothgery
Sheffield Lake, OH

- David Gordon: On Level 8 in *Gantelet*, the transporters have "sensitive corners." You must first find them, then you may go one of two ways. Going up and to the right puts you into a chamber where the bones surround a pair of keys. Or you can go to the right, then up, but you'll have to avoid Death in the process. You will end up in front of three corridors: the left leads to a dead end; the right leads to a plate of food; and the center leads to a great hall. Keep going right and you'll find the exit, but beware of Death.

Make sure your character is exactly on the teleporter or it has no effect.

The exit to Level 14 is in the lower right-hand corner of Level 13. Once on Level 14, you can explore or just exit to Level 15. After Level 15, you start to repeat levels. The exit on Level 15 is in one of the corners but it's not easy to get to.

David Schulze
San Antonio, TX

- Jason Bell: You cannot carry the treasure in *Sands of Egypt*, so type `GET LADDER`, `GO CRACK`, `GO ARCHWAY`, `UNTIE ROPE`, `UNTIE ROPE` again (once for the pole and once for the boat). Ride the current to the place where the hole is by pressing ENTER over and over. Then type `DROP LADDER` and `CLIMB`.

In *Pyramid 2000*, to get the statue you have to drop the scepter first. To open the sarcophagus you need the jewel encrested key. Does the nest of golden eggs belong to the statue?

In the *Interbank Incident*, what do you put in the slot on the yacht?

Patrick Slagle
Thibodaux, LA

- Rusty Merritt: To open the painted door in *Bedlam*, you have to get Napoleon in the room with the painted door and ask him to open the door.

Edward Rocha
Cobleskill, NY

- Steve Moore: After you find the secret passage in *Raaku-Tu*, type `GO IN PASSAGE`, but make sure you have everything you want because you cannot return to the temple.

Also in *Raaku-Tu*, I know how to get out of the temple but what do I do after I am out? How do I get over the rug or do I even need to get over it?

Tony Bacon
Mt. Vernon, IN

- Scott Melton: In *Sands of Egypt*, to avoid dying, start by going north three times and then west twice.

Marshall Miller
Oneonta, NY

- Damon McGaughey: In *Hall of the King*, you have to type `POUR ACID` and when it says "where?" type `STEEL BANDS`. Then get the one key piece and go to the room with the gate. Bend the crowbar and the rest is up to you.

Spencer Metcalf
Longview, TX

Scoreboard:

In *Dungeons of Daggorath*, when you get a ring revealed, look the word up in the dictionary; it gives you a better clue.

Darren King
Yorkton, Saskatchewan

Scoreboard:

Kill as many creatures and get as many items as you can before you venture into the second level in *Dungeons of Daggorath*. The stone giants and the knights are the toughest and the most dangerous. Place everything in front of you before you fight anything. Do not use pine torches on the third level.

In *Sands of Egypt*, the only items I can find are the magnifier, shovel, torch and canteen. Where are the scepter and the dates?

Eric Reitz
Mendham, NJ

Scoreboard:

In *Dungeons of Daggorath*, how do you kill the wizard's image?

In *Dallas Quest*, how can I pass the bay with the monkey without sinking?

Marc Paulin
Lameque, New Brunswick

Scoreboard:

In *Dungeons of Daggorath*, during a fight, find a good safe spot and drop most or all of your inventory. Most creatures will not attack you until they pick up everything on the floor. While they are picking up the objects, attack them. This works on all creatures except the scorpions, wizard's image and, of course, the wizard.

Stephen Dodgen
Pascagoula, MS

Scoreboard:

In *Rogue*, how do you kill a griffin? I try to polymorph them, but by that time I'm too weak. Is the Amulet of Yendor always on Level 26? I made it to that level but never found the amulet.

Kirk Marshall
Westport, MA

Scoreboard:

In *Rogue*, when you get to Level 6, or where there are sleeping leprechauns, don't try and hit them. Shoot them with a crossbow or bow from the farthest distance possible but still be in the same room and shoot at them until they are dead. Sometimes you can get 500 gold pieces.

In *Blackbeard's Island*, where do you fish for the anchor?

Cory Harris
Janesville, WI

Scoreboard:

In *Pyramid*, after you have the eggs and the key, use the key to open the sarcophagus. To cross the pit, wave the scepter. You do not have to worry about the batteries; they will be replaced automatically after your lamp goes out.

Keep in mind buying the batteries prevents you from winning the game.

In *Sands of Egypt*, try looking at the carving and have your snake oil ready.

In *Bedlam*, certain things cannot be accomplished unless they are part of the solution. To open the painted door, you must first meet Picasso, then get a lobotomy. If the painted door is in your cell after this, you can open it.

To kill the dog, put the pill in the meat and feed the meat to the dog.

To get the torch in *Sands of Egypt*, go south twice from the cliff and dig. Also, the rope is a hint; it will come in handy below the pool. The dates are at the top of the tree.

In *Madness and the Minotaur*, you score points by getting spells, or returning treasures to the forest. The Power ring, Light ring, Truth ring and Spellbook are also treasures.

To escape the maze: In the area with up and down exits in every room, go south as far as you can go and then go east as far as you can go. This should put you in the non-random part of the maze. Find the dead-end room with the small pit in the corner and jump it.

To get the first spell, find the food and the mushroom, and go to the first floor room where the air is crackling with enchantment.

After you get all the points in *Pyramid* and *Raaka-Tu*, how do you win? I can get all the points but the game does nothing.

Paul Riddle
Sykesville, MD

Scoreboard:

In *Pyramid 2000*, don't waste time or your coins. The pots are delicate and need soft ground. After you can locate all the treasures, start over and try to go through it in less moves before your light dies.

In the *Interbank Incident*, how do you find the crooks?

Adam Brower
Bossier City, LA

Scoreboard:

In *Dallas Quest*, how do you use the dinghy? In *Gates of Delirium*, how do you use the `OTHER` command to get allies?

Paul King
Nashville, TN

Scoreboard:

In *Dallas Quest*, I can't get past the giant rat to get the small shovel. In *Sands of Egypt*, I can only get to the part where I see the shovel and then I die of thirst.

In *Bag-It-Man*, I get all the money into my hide-out; then I get stumped because the money is in the hide-out and I am getting chased all over by guards. In *Blackbeard's Island*, I get the coconut, but there is no way of opening it.

In *Preserve Quandic*, I can't find the right password.

Thomas Crowe
Villa-vicencio, Meta, Colombia,

Scoreboard:

How do you get the flashlight in *Dallas Quest*?

Ric Yates
Corpus Christi, TX

Scoreboard:

I can't seem to find the dates used to feed the camel in *Sands of Egypt*, and I don't know what to do with the snake oil once I get to the pool. Also, where is the scepter?

Matt Hoyer
Chatsworth, CA

Scoreboard:

I have the dates and have arrived at the pyramid in *Sands of Egypt*, but I found out I needed the snake oil. Before I found this out, I typed `HELP` and it said, "Did you have any good dates lately?" Does that mean I have to eat them?

Curtis Schaaf
Moro, IL

Scoreboard:

In *Hitchhiker's Guide to the Galaxy*, you must block the bulldozer until Ford Prefect arrives. How do you get past the Bugblatter Beast to the opening to the west from his inner lair? How can you steal the heart of gold after the guards drop their rifles, and how can you get past the screening door on the ship?

In *Sands of Egypt*, you can't take the treasure. You must return to civilization and tell about it. To leave the underground river, you must get the ladder from the treasure room and climb out the drain from the boat.

In *Zork I*, what do you do in the shaft room, and what purpose does the scepter serve? Can you get rid of the granite wall?

John Austin
Clifton, TX

Scoreboard:

In *Hitchhiker's Guide to the Galaxy*, how do you get the vector plotter and keyboard, and how do you get past the screening door?

Stevie Nakahara
Garden Grove, CA

Scoreboard:

In *Trekboer*, I can get by the first spider, but I can't get by the second one.

Robert Johnston
Toledo, OH

Scoreboard:

In the *Interbank Incident*, what's the IBC gold card's code number? In *Sands of Egypt*, how do you get the treasure?

In *Dr. Avaloe* from the *First Rainbow Book of Adventures*, to get out of the first room, type `LOOK HOLE` then `DOWN HOLE`. In *Planetfall*, how do you get the key in the crevice?

How do you get the bird statue in *Pyramid*?

Phil Derksen
Hendersonville, NC

Scoreboard:

How do you open the safe in *Vortex Factor*?

David Whyburd
Peace River, Alberta

Scoreboard:

In *Blackbeard's Island*, what do I do with the anchor? How does it become a grappling hook?

Stu Scott
Sandyhook, CT

Scoreboard:

In *Sea Quest*, I can only find the anchor, pearl, diamond ring and silver. Is there anything else to be found?

In *Shenanigans*, how do I find the clover field?

Ted Scarbrough
Clarkston, GA

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

— Jody Doyle

Parlez-Vous CoCo Francais?

By Joseph Kolar
Rainbow Contributing Editor

Educational programs intrigue me, and foreign languages have always sustained my interest. Naturally, I inspected the CoCo 3 to see if it could be utilized in these areas.

Having constructed various language programs in German, French, Italian, Spanish, Portuguese, Romanian, not to mention Japanese and Russian, I discovered that a great disadvantage of older CoCos is their inability to quickly and effortlessly create unique letters formed of various diacritical marks and shapes inherent to specific languages.

You are all familiar with the double-dot (umlaut) that graces some German vowels. You are also probably aware of the slant accents over vowels in French, Italian or Spanish. These marks indicate a specific phonetic value for a vowel or consonant.

CoCo 3 makes most of these special diacritical marks available in the Hi-Res mode.

Back up a minute. We previously learned about the `ASC` function. Briefly, it converts a character or string variable to its corresponding ASCII decimal number. `CHR$` works like a mirror image of `ASC` and retrieves a single character that is represented by the ASCII decimal number code.

All CoCo owners, pay attention! Key in:

```
1 CLS
10 PRINT@140,;:INPUTX
20 Y$=CHR$(X)
30 PRINT@142,"  "Y$;X
40 GOTO10
```

Run, and enter a value of 75, which will be our ASCII value. CoCo, using the `CHR$` function, obligingly spits out the character representing the ASCII decimal number.

In order to get CoCo to place the input question mark in the upper-middle of the display, I specified a particular 32-by-16 screen `PRINT@` address: Line 10 does this. To make this stratagem plainer, quotes should have been inserted in front of the semicolon, but they are optional. To obliterate the prompted value, Line 30 uses another `PRINT@` with two spaces enclosed within quote marks. The blanks overprint the `ASC` value input, and both the `CHR$` and `ASC` values are displayed side by side.

Try various numbers from 33 to 255 and see what is what.

A note of caution: If you have a Hi-Res program in CoCo 3 and then enter `NEW` instead of `OFF` and `ON` to load a Lo-Res program that doesn't have a `WIDTH32` statement in it, you are apt to be astounded with an HP Error. Merely type in and enter `WIDTH32` to get into sync with domineering CoCo 3.

Type and enter `5 WIDTH32`. Run and enter a value of `75`. So far, so good. Now enter `5 WIDTH40` and run. Indignant CoCo 3 gives us an anticipated HP Error message.

We suspect that `PRINT@` is a no-no in Hi-Res CoCo 3. We convert to `LOCATEa,b` and search for equivalent a,b values. A guess of 15,4 comes close, but 16,4 is a good replacement. Try entering `LOCATE16,4:`, and run. Oops! CoCo 3 protests the other `PRINT@` location, and a conversion to `LOCATE 19,4:` is suitable. Run.

In `WIDTH40` we uncover some strange characters residing in ASCII 128 through 159. You will find the entire set in your manual. For a dynamic look-see, key in:

```
7 FOR X=128 TO 159
35 FOR Y=1 TO 1000: NEXT Y,X
```

Rekey lines 10, 30 and 40:

```
10 LOCATE16,4:INPUTX
30 LOCATE19,4:PRINT Y$;X
40 GOTO7
```

Run, and look at the new immigrants on the block. Save our work as `"LOW"`, if you desire.

To compare the newcomers with the "old residents" in ASCII 128 through 159, key in the following lines:

```
40 WIDTH32
45 FOR X=128 TO 159
50 PRINT@139,X
60 Y$=CHR$(X)
70 PRINT140,"   "Y$;X
```

(Note three spaces within quotes!)

```
80 FOR Y=1 TO 1000:NEXT Y,X
90 GOTO5
```

Run, and save our work as `"HIAND-LOW"`.

In `WIDTH32`, `ASC(96)` will print a reversed @. In `WIDTH40`, CoCo 3 will print a carat. You might want to change the number `128` to `123` in both lines 7 and 45 to see a few more aliens. Run.

Incidentally, if you want to check out the Lo-Res `CHR$` characters first, press the BREAK key and enter `RUN40-`. This program has two separate routines that follow each other in a loop. The second one is linked with the first by Line 90.

Now that you have had it up to here with `ASC` and `CHR$`, we shall give our

---

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

undivided attention to using some of these "foreigners" in a language program.

If you have the itch, you can make either authentic German or French language text on CoCo 3. For our foreign text we shall select French as the guinea pig. Clear your computer by typing and entering `NEW`.

Key in listing `FRENCHTX` on your CoCo 3. If you are not into languages, do not worry if you misspell some words. Just make sure you have the same number of letters. (This is a demo — not a typing test.)

This program is in Hi-Res text mode to enable CoCo 3 to show off the proper accented characters.

Note that I maintain an interval of nine between program line numbers. Usually, Line 0 is reserved for a title. I begin with Line 10.

`ON BRK GOTO2060` tells CoCo 3 to change over to a 32-by-16 screen and list the program up to Line 1000. This is done in order to position myself at the end of my French text block (50 through 1999) so I could conveniently add more lines in a logical sequence.

I like to use low numbers for `GOSUB` routine lines because they are short, easy to remember, easy to type and readily found for inspection or consultation at the beginning of a program.

Eight useful characters are found, lines 1 through 8). Look in the manual or inspect `HIANDLOW` to see which `CHR$` is in each of the `GOSUB` routines.

After I keyed in lines 1 through 8, I was annoyed to find that I had to go around them to begin the program at Line 10. That's why I violated my own rule about reserving Line 0 for a title and squeezed in instructions to bypass the `GOSUB` routines. They are my rules and who ever heard of a rule that didn't have exceptions?

Lines 20 through 40 gave me a Hi-Res text screen, indented my first paragraph and chose both the foreground and background colors.

The text began on Line 50 and continued to Line 250 on the first display page. CoCo 3 was then directed to a `GOSUB` routine that flashed a blinking prompt message asking CoCo 3 to wait for F1 key to be pressed. If CoCo 3 detected `PEEK(343)=191`, it knew the F1 key was being pressed and would graciously clear the screen and locate the start of the second page. Otherwise, the CoCo would sit there all night long, waiting for F1 or, as you will see, F2, to be pressed.

The second page was running from Line 265 to 390 when I stopped and called it a day. Line 400 calls the F2 routine at Line 3000, where CoCo 3 inquires if you want to return to the beginning of the program by pressing F2 (if you don't respond, it will take a nap).

Line 45 is dormant. Unmasked, it tells CoCo 3 to go directly to the second working page. This is great when you are working on this page and don't want to be bothered with the first display page distracting you. Lines 1240 and 1999 are fossils from an earlier version of this program.

For the record, the 'e' in `CHR$(130)` is called *e accent aigu*; the 'e' in `CHR$(138)` is an *e accent grave*; the 'o' in `CHR$(143)` is *o circonflexe*; and the 'c' in `CHR$(135)` is the *cedilla*. I had no occasion to use `ASC(139)` or `(148)`. *C'est la vie*! (That's life!)

Run our program and save it as `"FRENCHTX"`.

Look over the listing and focus in on Line 50. Note that every line of text will begin and end with a blank space. The reason for this will become apparent later. The paragraph is indented to begin at Column 5, and each succeeding line begins at Column 2.

Consider Line 50 to be a bunch of statements tacked together to make up a strip of text on a single row. We have:

```
1) PRINT" En France, un ";:
2) GOSUB1 :
3) PRINT"1";:
4) GOSUB2 :
5) PRINT"ve doit r";:
6) GOSUB1 :
7) PRINT"ussir";
```

These seven segments are glued together with semicolons that tell CoCo 3 to butt each succeeding statement to that of the preceding one. Provisions for butting-up are made in the `GOSUB` routines, lines 1 through 8, that house the special characters (look for the semicolon):

1) It has both a leading and a trailing blank space.
2) The accented 'e', `CHR$(130)`, begins a word and tacks onto the space allowed for in 1.

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3) One lonely letter is added to the accented 'e'.
4) *Another* type of accented 'e' is called by `GOSUB2` and attached to the 'l' in 3.
5) It adds the rest of the word and continues the text until the next special letter is due. It happens to occur in the middle of a word.
6) Another accented 'e' is called up to join the parade of letters.
7) Finally, the rest of the word is printed. Note that a blank ending space will be provided. For now, you can't see it, but rest assured that it is there.

This completes the line. How do you *know* when to begin a new line of text? When you near the end of the line you must become alert. There is no hard and fast rule; it depends on the length of the words involved.

Edit Line 50 by entering `EDIT50`. Type X to jump to the end of the line. Backspace two spaces. Press the space bar and type `";`. This adds the space after the last word. Enter `:GOSUB5`, enter, and run. This works, but you can see it leaves that strange vowel hanging in the corner.

For argument's sake, let us add the next word to Line 50. Enter `EDIT50`, and type X to jump to the end of the line. Press I to insert, then press shifted 0, and enter `PRINT"1'examen";`. Press shifted 0 again, and press ENTER. Run. The word wends its way onto the intervening blank row.

To restore the original Line 50, type and enter `EDIT50`, pressing X to jump to the end of the line. Backspace 28 spaces, enter `";`, and run.

The second text line ends in a long word. There are two options: first, move the entire word to the next available text line; second, break the word up into syllables.

How the text is ultimately formatted is your business. You are the typesetter. You may strive to keep a few blank spaces at the right margin. I tried but violated my own rule, as the last two lines on the first display page will attest. It seems to flesh out the text and appeals to me.

Press F1. The second page is merely a continuation of text presentation and could go on and on and on. I pooped out in the middle of the second display page and called it a day. You might consider relocating the flashing legend, Line 3000, to the 15th row.

Enter `EDIT3000` and press the space bar until the cursor is under the 2. Type `2C`, then type `15`, and press ENTER. Run. Now it looks bad and conflicts with the text. Back to the drawing board! Return Line 3000 to its original state.

Follow Line 70 and every succeeding text line, and you will find that your prime concerns are dual: first, to provide spaces where required; and second, to end each line of text in a neat manner allowing for a right margin.

Suppose we change the color to make neat, colorful strips of text? Enter `EDIT40` and press X. Backspace one space, type `7`, press ENTER, and run. Look at the three orange squares at the left edge. The last space of each of the offending lines ran over to the next row, spoiling the effect we labored so hard to achieve.

It would be a lot of unproductive work to clear this up. "Depend" would have to be hyphenated, requiring an extra ribbon of text because, as luck would have it, it is the very last word of the paragraph. It also says something about lousy planning.

The last two text lines should also be pushed to the following text strips, and this will inevitably run over and disturb the second display page.

Enter `EDIT265`, press X and type and enter `:ATTR4,7`. Run, and press the F1 key. See how nice the second page is? Press F2. In conclusion, it is easier to hide the orange squares.

Type and enter `235 LOCATE0,20 :ATTR0,5`. Enter `EDIT240`, press X, type `:ATTR4,7`, and press ENTER. Enter `255 LOCATE0,22:ATTR0,5`, and run.

We did not need to restore the orange strip color further because we already edited Line 265. Save our work now, if you want.

It's too bad the people at Microsoft didn't create the nasalized 'n' (as in canyon) so that Spanish language programs could be developed.

German programs can be created with the three double-dot vowels and with `CHR$(141)` to simulate the "double s" consonant.

It is safe to say that you now know how to utilize some of the odd-ball characters in Hi-Res text. This includes `CHR$(96)` and from `(123)` to `(159)`. You never know when you might call on CoCo 3 to produce these unusual characters.

I hope you enjoyed the editing practice provided and received encouragement to continue to study all these little nitty-gritty features of CoCo 3. ☐

Listing 1:

```
0 '<HIANDLOW>
1 CLS
5 WIDTH40
7 FOR X=128 TO 159
10 LOCATE16,4:'INPUTX
20 Y$=CHR$(X)
30 LOCATE19,4:PRINTY$;X
35 FOR Y=1 TO 1000:NEXTY,X
40 WIDTH32
45 FOR X=128 TO 159
50 PRINT@139,X
60 Y$=CHR$(X)
70 PRINT@140,"     "Y$;X
80 FOR Y=1 TO 1000:NEXTY,X
90 GOTO5
```

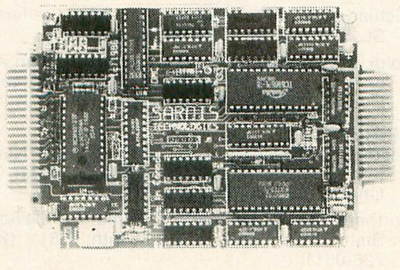
Listing 2:

```
0 GOTO10'<FRENCHTX>
1 PRINTCHR$(130);:RETURN
2 PRINTCHR$(138);:RETURN
3 PRINTCHR$(135);:RETURN
4 PRINTCHR$(147);:RETURN
5 PRINTCHR$(133);:RETURN
6 PRINTCHR$(136);:RETURN
7 PRINTCHR$(131);:RETURN
8 PRINTCHR$(151);:RETURN
10 ON BRK GOTO2060
20 WIDTH40
30 LOCATE5,1
40 ATTR4,5
45 'GOTO265
50 PRINT" En France, un ";:GOSUB
1:PRINT"l";:GOSUB2:PRINT"ve doit
```

```
 r";:GOSUB1:PRINT"ussir";
60 LOCATE2,3
70 PRINT" ";:GOSUB5:PRINT" l'exa
men qui s'appelle le bacca-";
80 LOCATE2,5
90 PRINT" laur";:GOSUB1:PRINT"ea
t (famili";:GOSUB2:PRINT"rement,
 le <bac> ou";
100 LOCATE2,7
110 PRINT" le <bachot>) avant de
 pouvier entrer";
120 LOCATE2,9
130 PRINT" ";:GOSUB5:PRINT" l'un
iversit";:GOSUB1:PRINT". Est-ce
 important?";
140 LOCATE2,11
150 PRINT" C'est plus qu'importa
nt; c'est un";
160 LOCATE2,13
170 PRINT" drame dans la vie de
chaque jeune";
180 LOCATE2,15
190 PRINT" Fran";:GOSUB3:PRINT"a
is.  Tout son avenir en d";:GOSU
B1:PRINT"pend.";
200 LOCATE5,17
210 PRINT" On passe l'examen dan
s toute la";
220 LOCATE2,19
230 PRINT" France au m";:GOSUB6:
PRINT"me moment; les copies des"
;
240 LOCATE2,21
250 PRINT" ";:GOSUB1:PRINT"l";:G
OSUB2:PRINT"ves sont ensuite cor
rig";:GOSUB1:PRINT"es non pas";
260 GOSUB2000
265 LOCATE2,1
270 PRINT" par leurs professeurs
 ";:GOSUB5:PRINT" eux, mais";
280 LOCATE2,3
290 PRINT" par des <correcteurs>
 qu'ils ne";
300 LOCATE2,5
310 PRINT" connaissent pas -- et
 qui ne les";
320 LOCATE2,7
330 PRINT" connaissent pas.  Le
bac ";:GOSUB1:PRINT"tant un";
340 LOCATE2,9
350 PRINT" examen difficile, il
y a tourjours";
360 LOCATE2,11
370 PRINT" une proportion consid
";:GOSUB1:PRINT"rable d'";:GOSUB
1:PRINT"l";:GOSUB2:PRINT"ves";
380 LOCATE2,13
390 PRINT" qui ";:GOSUB1:PRINT"c
houent.";
400 GOSUB3000
1240 'GOSUB3000
1999 GOTO1999
2000 LOCATE8,23:ATTR3,5,B
2010 PRINT"  PRESS <F1> TO CONTI
NUE. ";
2020 ATTR5,5:LOCATE0,0
2030 IF PEEK(343)=191 THEN 2040
ELSE2030
2040 CLS:LOCATE5,1:ATTR4,5
2050 RETURN
2060 WIDTH32:LIST-1000
3000 LOCATE5,23:ATTR3,5,B
3010 PRINT"  PRESS <F2> TO RETUR
N TO START. ";
3015 ATTR5,5:LOCATE0,0
3020 IF PEEK(344)=191 THEN 0 ELS
E 3020
```

NEW

DMC "No Halt" Disk Controller



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We compile a list quarterly of Color Computer Clubs because of the many requests we receive. CoCo Clubs may wish to exchange newsletters, share ideas for topics of discussion at monthly meetings, etc.

Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs that have signed our anti-piracy agreement form will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

— Monica Wheat

ARIZONA

Tucson Color Computer Club, Bill Nunn, 9631 E. Stella, Tucson, 85730, (602) 721-1085

CALIFORNIA

Color America Users Group, Mark Randall, 2227 Canyon Road, Arcadia, 91006, (818) 355-6111

CoCo-3 World, Fred K. Wright, 10112 Melody Park Dr., Garden Grove, 92640, (714) 534-5174

Los Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213, (213) 838-4293

United Computer Federation, (San Fernando Valley Chapter and Headquarters), Pete Ellison, 366 West Providencia Ave., Burbank, 91506, (818) 840-8902

United Computer Federation, (San Francisco Chapter), Art Murray, P.O. Box 7007, Redwood City, 94063, (415) 366-4560, BBS (415) 364-2658

United Computer Federation, (Los Angeles Chapter), Gary James, 4147 Faculty Avenue, Long Beach, 90808

United Computer Federation, (Orange County Chapter), Fred Wright, 10112 Melody Park Drive, Garden Grove, 92640

The Davis CoCoNuts, Shneor Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

South Bay Users Group (S-Bug), Patricia Scheffer, P.O. Box 653, Hawthorne, 90251, (213) 532-8071

Ventura County Color Computer Club (VC4), Doug McLaughlin, Oxnard Public Library, 214 South "C" Street, Oxnard, 93030, (805) 984-4636 or BBS (805) 484-5491

Citrus Color Computer Club, Jack Brinker, P.O. Box 6991, San Bernadino, 92412, (714) 824-1866

South Bay Color Computer Users Group, John G. Say, 3117 Balmoral Drive, San Jose, 95132, (408) 923-2967

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Colorado Color Computer Club, Lloyd Carroll, 6651 Bellaire Street, Commerce City, 80022, (303) 288-6369

The ESCO Computer Club, David E. Schulz, 1299 Harrison Street, Denver, 80206, (303) 388-6988

CONNECTICUT

The Southeast Connecticut Color Computer Users Group, Bill Gross, 30 Sycamore Lane, Groton, 06340, (203) 448-1388

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Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Rd., Dale City, Virginia 22193, (703) 690-2453

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Color Computer Club of Brandon, Richard Steinbrueck, 2913 John Moore Road, Brandon, 33511, (813) 681-1526

Northwest Florida CoCo Nuts, Lee Gottcher, P.O. Box 1032, Fort Walton Beach, 32549, (904) 678-8894

Alachua County Color Computer Club, Robert J. Lake, 2929 N.E. 12th Street, Gainesville, 32609, (904) 378-1993

Jacksonville Color Computer Club, William H. Brown III, 2411 Hirsch Ave., Jacksonville, 32216, (904) 721-0282

Broward County Color Computer Club, George Aloia, 2263 N.W. 65 Avenue, Margate, 33063, (305) 972-0975

South Brevard Color Computer Club, Benjamin S. Jerome, 496 Hillside Court, Melbourne, 32935, (305) 259-4609

Color-6809 Users Group, Emery Mandel, 4301 11th Avenue North, St. Petersburg, 33713-5207, (813) 323-3570, BBS (813) 321-0397

C.C. Club of Sarasota, Ernie Bontrager, 4047 Bee Ridge Rd., Sarasota, 33583, (813) 921-7510

GEORGIA

The Northeast Atlanta Color Computer Club, Joe Novosel, P.O. Box 450915, Atlanta, 30345, (404) 921-7418

The CoCo Cartel, Dennis M. Weldy, 4059 Acacia Drive, Columbus, 31904, (404) 576-5479

Atlanta Color Computer Users Group, Terry E. Love, 5155 Maroney Mill Rd., Douglasville, 30134, (404) 949-5356

ILLINOIS

Illinois Color Computer Club of Elgin, Tony Podraza, 119 Adobe Circle, Carpentersville, 60110, (312) 428-3576

Northern Illinois Color Computer Club, Kenneth Trenchard, Sr., 6145 N. Sheridan Road 30, Chicago, 60660, (312) 973-5208

Willow-Works Club, Kevin L. Adair, 5753 S. Laflin, Chicago, 60636, (312) 737-5716

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Kitchen Table Color Computer Group, Robert Mills, P.O. Box 464, Hanover, 61041, (815) 591-3377

Motorola Microcomputer Club, Steve Adler, 1301 Algonquin Rd., Schaumburg, 60196, (312) 576-3044

Chicago OS-9 Users Group, John Chasteen, 480 Gilbert Drive, Wood Dale, 60191, (312) 860-2580

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Three Rivers Color Computer Club, Eddie Nast, R.R. 3, Box 269, Angola, 46703

CoCo Program Exchange, Erik Merz, 3307 Arrow Wood Dr., Fort Wayne, 46815, (219) 749-0294

Indy Color Computer Club, Kevin S. Jessup, Sr., P.O. Box 26521, Indianapolis, 46236, (317) 873-5808

Southern Indiana Computer Club, Route 1, Box 459, Mitchell, 47446

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

IOWA

CoCo Questers, Scott Bellman, 2420 Salem Court, Bettendorf, 52722, (319) 359-7702

Metro Area Color Computer Club (MACCC), David E. Hansen, 3147 Avenue J, Council Bluffs, 51501, (712) 323-7867

Mid Iowa CoCo, Terry G. Simons, 1328 48th Street, Des Moines, 50311, (515) 279-2576

Dubuque Tandy Users Group, Wesley Kullhem, 1995 Lombard, Dubuque, 52001, (319) 556-4137

KANSAS

Hutchinson Color Computer Club, James M. Jones, 612 Idlewild, Hutchinson, 67502, (316) 662-0718

KC CoCo Club, Gay Crawford, P.O. Box 11192, Kansas City, 66111, (913) 764-9413

Micro 80 Users Group, Kevin Cronister, 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, David Brimmer, 527 N. Pershing Ave., Wichita, 67208, (316) 685-9587

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Perry County CoCo Users Group, Keith W. Smith, General Delivery, Hardburly, 41747, (606) 439-4209

LOCO-COCO, Jim Spillman, 2405 Woodmont Dr., Louisville, 40220, (502) 454-5331

The Basic Byte, Don Henderson, 152 Patty Lane, Florence, 41042, (606) 371-9368

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Tandy Computer Club, Delmer Cargill, P.O. Box 428, Westbrook, 04092, (207) 854-2862

MARYLAND

Arkade, John M. Beck, 3513 Terrace Drive #D, Suitland, 20746, (301) 423-8418

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The Computer Connection, Ken Ferreira, 21 George St., Oxford, 01540, (617) 987-0197

Greater Boston Super Color Users Group, Robert Biamonte, 6 Boulder Drive, Burlington, 01803

CLUB 6809, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

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Color C.H.I.P.S., Jack Pieron, 3175 Oakhill Place, Clarkston, 48016, (313) 627-4358

Tandy Users Group of Grand Rapids, Robert M. Worth, Jr., 1726 Millbank S.E., Grand Rapids, 49508 (616) 245-9324

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Color Computer Owners Group, Charles Van Ark, c/o DSL Computer Products, Inc., 4950 Shaefer, Dearborn, 48126, (313) 582-8930

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Northern Minnesota CoCo Community, David B. Smith, 4112 Trinity Road, Duluth, 55811, (218) 726-0511

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— Color Computer News, Jan. 1982

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CoCo Art Club, Joel Bunyard, Rt. 16, Box 11, Meridian, 39301, (601) 483-0424

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Mid-America Color Computer User's Group, Jerry Morgon, 807 Ponca Drive, Independence, 64056, (816) 796-5813

Coconuts, Steve Knittel 1610 N. Marlan, Springfield, 65803, (417) 485-3419

Mako TRS-80 & Tandy Users Group, David Morgan, 622 Porter, Joplin, 64801, (417) 781-6546

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C.A.T. F.U.N., Paul A. Osborne, 201 Miners Road, Fallon, 89406, (702) 423-5789

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West Orange CoCo Club, Gregg Favalora, 12 Blackburne Terrace, W. Orange, 07052, (201) 736-1748 (let ring 12 times)

Mercer County Color Computer Users Group, Richard C. Kelly, 1904 Country Lane, W. Trenton, 08628, (609) 883-9270

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Chaves County Color Computer Club, Harry Machen, 18 Forest Drive, Roswell, 88201,

CoCo Users Group, David M. Hutchison, 732 Landman Pl. NE, Albuquerque, 87123, (505) 294-4732

The Curry County CoCo Club, Ron Bull, 100 Conestoga Trail, Clovis, 88101, (505) 763-4713

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Adirondack CoCo Club (Albany Chapter), Ron Fish, Box 4125, Albany, 12204, (518) 465-9793

Adirondack CoCo Club, (Greene County Chapter), Pete Chast, P.O. Box 61, Athens, 12015, (518) 945-1636

Adirondack CoCo Club (Glens Falls Chapter), Richard Mitchell, 39 Center St., Fort Edwards, 12828

The Island CoCo Club, D.K. Lee, P.O. Box 426, Massapequa Park, 11762, BBS (516) 227-1285

Kings Byte CoCo Club, Morty Libowitz, 1063 East 84th St., Brooklyn, 11236, (718) 763-4233, BBS (718) 837-2881

C.C. Club of Central N.Y., Joseph Short, 248 S. Fourth Ave., Ilion, 13357, (315) 895-7730

Rockland County Color Computer Users Group, Harold L. Laroff, P.O. Box 131, Monsey, 10952-0131, (914) 425-2274

Metropolitan Color Computer Users Group, Danny Iacovou, 21-36 42 St., Astoria, 11105, (718) 204-4770

Olean Area CoCo Users Group, Herman L. Smith, P.O. Box 216, Olean, 14760, (716) 933-7488, BBS (716) 933-7489

Twin Tiers CoCo Club, William Cecchini, 319 Irvine Place, Elmira, 14901, (607) 734-0065

The Rochester S-80 Computer Club, Inc., Gary Panepinto, P.O. Box 15476, Rochester, 14615, (716) 392-6133

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Raleigh Color Computer Club, Pete Katz, 505 Berkshire, Garner, 27529

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Central Ohio Color Computer Club, Jim Upperman, 5201 Wilcox Road, Amlin, 43002, (614) 876-1767

Color Computer Club, Inc., William Wills, P.O. Box 468, Canfield, 44406

Dayton Color Computer Users Group, Steven E. Lewis, 4230 Cordell Dr., Dayton, 45439, (513) 299-3060

Dayton Area Color Computer Users Group, David R. Barr, 2278 Yorkshire Pl., Kettering, 45419, (513) 293-2228

Greater Toledo Color Computer Club, Robin Jackson, 2053 Eileen Road, Toledo, 43615, (419) 531-4549

Tri-County Computer Users Group, William J. Loeffler, 2612 Dale Avenue, Rocky River, 44116, (216) 356-0779

Miami Valley CoCo Club, Tim Ellis, 1805 W. Parkway Dr., Piqua, 45356, (513) 773-2244

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Central Oklahoma Computer Organization, Inc., Martin Schiel, 5313 Spitz Drive, Oklahoma City, 73135, (405) 670-6891

Green Country Computer Association, Michael Keller, P.O. Box 2431, Tulsa, 74101, (918) 245-3456 (data)

Central Oklahoma Computer Organization Inc., Enid Chapter, Jim Sands, 706 South Grand, Enid, 73701, (405) 237-5949

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SNUG-Phila., William K. Serody, 1181 Cumberland Road, Abington, 19001, (215) 887-0513

HUG-A-CoCo, George Lurie, 2012 Mill Plain Court, Harrisburg, 17110, (717) 657-2789

Penn-Jersey Color Computer Club, P.O. Box 2742, Lehigh Valley, 18001

Williamsport Area Color Computer Club, John M. Rymell, R.D. 3, Box 182, Muney, 17756, (717) 546-2721

The CoCo Exchange Club, Daniel Moore, 617 Prescott Avenue, Scranton, 18510, (717) 961-0535

Skyline Color Computer Club of Berks County, Lewis F. Brubaker, 4874 Eighth Ave., Temple, 19560, (215) 921-3616

Pittsburgh Color Group, Ralph Marting, 309 Frazier Dr., Pittsburgh, PA, 15235

The Hollidaysburg Area Color Computer Club, Bill Smith, P.O. Box 101, Roaring Spring, 16673, (814) 224-5280

The Monthly CoCo Newsletter, Dino DiEnno, 715 So. Hutchinson, Philadelphia, 19147, (215) 923-2454

Philadelphia Area Computer Society (PACS) Color Computer Special Interest Group (SIG), Robert Toscani, LaSalle University, 19th & Olney Sts., Box 312, Philadelphia, 19141, (215) 567-4276 (Arnie Weiss)

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Memphis Color Computer Users Group, Logan R. Ward, 5512 Poplar, Memphis, 38119, (901) 685-0009

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Central Virginia Color Computer Club, Roger Lee, Rt. 2 Box 175, Madison Heights, 24572

Color Company, Rick Blouin, 12007-C3 Greywing Sq., Reston, 22091, (703) 860-9297

Richmond Area Color Computer Organization, William Mays, 6003 Westbourne Drive, Richmond, 23230, (804) 282-7778

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Northwest Computer Club, Lin Shapel, East 1812 Rockwell, Spokane, 99207, (509) 487-8365

Mount Rainier Color Computer Club, Ron Amos, 2450 Lenore Drive N., Tacoma, 98406, (206) 752-8735

Tri-Cities Color Computer Users' Group/OS-9 SIG, Jim Vestal, P.O. Box 1213, Richland, 99352, (509) 943-4832

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Ohio Valley Association of Computers, Bill Davis, 1142 Courtland, Weirton, 26062, voice (304) 797-8321, data (304) 797-8671

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Blennerhassett CoCo Club, David Greathouse, 1306 Wells Circle, Parkersburg, 26101, (304) 424-7108

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Southern Wisconsin CoCo Club, David C. Buehn, 24607 67th Street, Salem, 53168, (414) 843-3830

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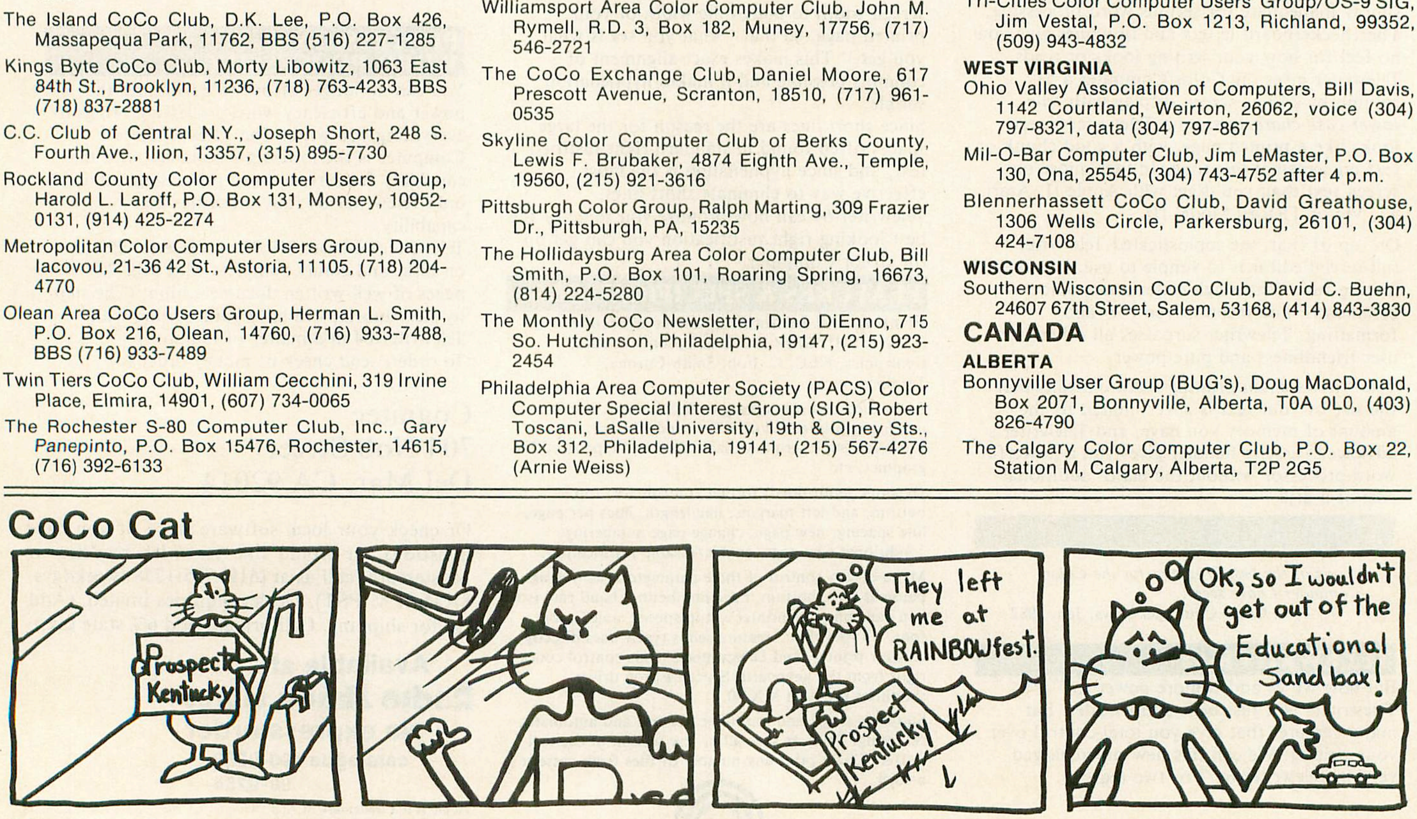
The Calgary Color Computer Club, P.O. Box 22, Station M, Calgary, Alberta, T2P 2G5

CoCo Cat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Salmon Arm CoCo, David Coldwell, RR #4, Site 26 Comp. 13, Salmon Arm, British Columbia, V1E 4M4

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Winnipeg Micro-80 Users Group, Robert Black, 1755 King Edward St., Winnipeg, Manitoba, R2R 0M3, (204) 633-7196

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Freecoco Club, Novoa, Miguel Angel-Ing. Duarte, Omar, Mendez de Andes 799, Buenos Aires, Capital Federal 1405, Argentina, phone 431-2501

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COCOPUG, Harry Murphy, 8 Lois Court, Regentsville, New South Wales, Australia, 2750

CoCoHUG (Color Computer Hobart Users Group), Robert Delbourgo, 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, Australia 7005

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CoCo-Byte, Fabian A. Rodriguez, Avenida 4A #49N-60 or A.A. 5976, Cali, Colombia, 640705-649165

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First Color Computer Users Group of Hermosillo, Arturo Fernandez Diaz-Gonzalez, Javier de Leon No. 708, Colonia Pitic, Hermosillo, Sonora, Mexico, phone 4-75-78

the NETHERLANDS

Color Computer Club Benelux, Jorgen te Giffel, Eikenlaan 1, 4641 GB Ossendrecht, the Netherlands

CoCoCE, J. Slaats, Chopinlaan 11, 5653 ET Eindhoven, the Netherlands, (040) 512-222

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Puerto Rico Color Computer Users Club, P.A. Torres, Cuernavaca 1699, Venus Gardens, Rio Piedras, Puerto Rico 00926, Phone (137) 755-7598

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First CoCo Club Hamburg, Theis Klauberg, Krietkamp 27A, Hamburg 65, West Germany, 2000, (040) 536-3676

The Greatest German CoCoCooks, Michael Herbes, Dorfstr 23, 4320 Hattinger, West Germany

new clubs

- I want to start a CoCo Users group in Rapid City, South Dakota. I am 18 years old and am in the Air Force. Anyone interested should reply by writing. My system consists of 128K CoCo 3, FD-500 disk drive, CM-8 monitor, CCR-81 cassette recorder, touch pad, joysticks and DMP-105 printer.

Andrew Urquhart
PSC Box 988
Ellsworth AFB, SD 57706

- Since I've never seen a listing for a Minnesota CoCo Users Group — I guess I'll have to start one! Let's hear from you!

David B. Smith
4112 Trinity Road
Duluth, MN 55811

***
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THE ADDENDUM

This picks up where The Book left off. It describes all the CoCo 3 enhancements and how to use them with assembly language. Wow - what features and many are not explained any place else. Without this book your CoCo 3 is just idling. Super-Res Graphics - Virtual Memory - New Interrupts - $12.00 + $1.00 s/h

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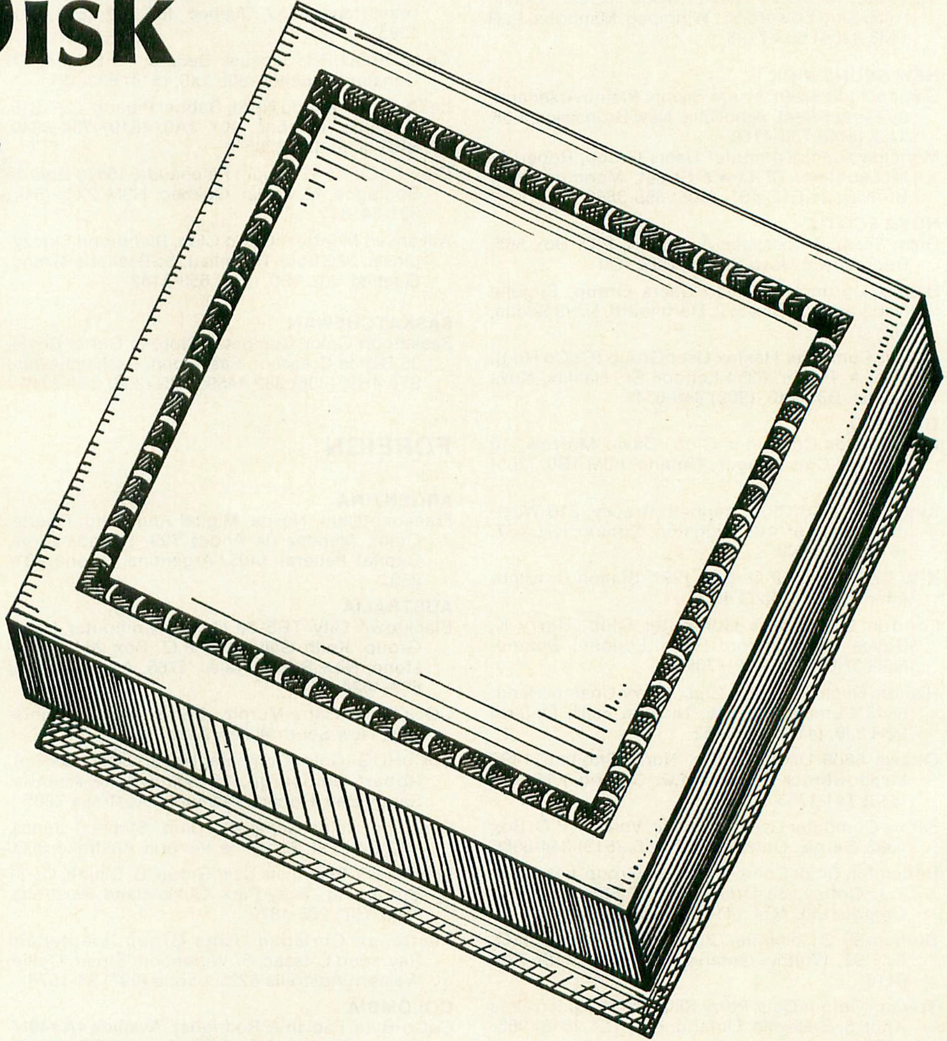
By David Dawson



After two days of working with my new CoCo 3, only a dozen programs refused to work. Considering I have collected nearly 2,000 programs over the years, this is quite good. A few did require patches, though, and the program appearing here is one of the most significant.

Although almost everything worked without problem, many ROM packs I acquired long ago that were transferred to disk would no longer work.

The patch program I had been using up to the purchase of the CoCo 3 is one that appeared in *HOT CoCo* in September 1983, written by Doctor ASCII, Richard Esposito. I obviously needed a new patch and, after trying several strategies, I was stumped since the only CoCo 3 manual I have is the one Radio Shack sells with the computer.

I found the solution by studying Esposito's column in the January RAINBOW (Page 167) and by understanding the CoCo's new GIME chip. I realized the memory locations beginning with hexadecimal $FFA0 control memory that appears in a memory map area. For example, the value in $FFA0 determines the actual memory seen by the Color Computer in the locations 0000 to 2000 (Hex) or 70000 to 72000 in the new memory map notation.

So, if you wanted (though you would have to write your own operating system), you could have a single 8K block of memory appear many times in the memory map, which is exactly how the short assembly language program in Listing 1 works. The program pack code is loaded into normal program memory where any BASIC program might reside; then my patch tells the GIME that this is the program pack memory and replaces this newly moved memory with a block from the upper 64K.

Using the Program

There is no need to get out your assembler or to type in Listing 1; the BASIC program in Listing 2 contains a loader for the machine code. I have also included part of the code that appeared in *HOT CoCo*. Including this allows my program to test and do the old CoCo patch if you are not using a CoCo 3. This makes this patch downwardly compatible.

To use the program, you must either have some patched ROM packs on disk or save the contents of a ROM pack to tape before running this program.

To save a program pack to tape, merely expose the ROM pack's connections and tape the far-left one (if you orient the ROM pack label side down with the connections facing away from you). Then insert the program pack with the power off. Power up the computer and you should get the normal sign-on message — if you do not, recheck the lead you taped and make sure the program pack is securely inserted.

Next, prepare the tape recorder, type `POKE&HFFDE,0:CSAVEM"filename",`

David Dawson is currently completing his doctorate in human factors psychology. David, his wife, Leigh Anne, and his son, Adam, all enjoy their CoCo 3.

`&HC000,&HFEFF,&HC000` and press ENTER. When the tape stops, turn the computer off again, reinsert the disk controller and run the program shown in Listing 2.

The program is straightforward as long as you have either a tape dump of the ROM pack code or a disk program that was patched with Esposito's original program. If you attempt to repatch a disk program modified in some other way, you will get an error message.

Also, due to the nature of the original programming, some ROM Paks *cannot* be transferred with my program as it stands.

(Questions about this program may be addressed to the author at 434 N. Pine St. #31, Vermillion, SD 57069. Please enclose an SASE when writing for a reply.) ☐

Listing 1:

```
                       00010 *****************************
                       00020 * COCO 3 ROMFIX PATCH    *
                       00030 *BY DAVID LIONELL DAWSON*
                       00040 *****************************
3F48                   00100 ORG 16200
3F48 B6      80FD      00101 LDA 33021 ROM VERSION NUMBER
3F4B 81      32        00102 CMPA #50 IS IT A COCO 3?
3F4D 27      03        00103 BEQ COCO3
3F4F 7E      3F9A      00104 JMP 16282 IF NOT DO COCO 1&2 FIX
3F52 1A      50        00110 COCO3 ORCC #$50 KILL INTERRUPTS
3F54 86      7A        00120 LDA #$7A SELECT BANK AT PRESENT MEM 16384
3F56 B7      FFA6      00130 STA $FFA6 AND BANK IT TO CARTRIDGE MEMORY
3F59 86      7B        00131 LDA #$7B ALSO BANK NEXT 8K..
3F5B B7      FFA7      00132 STA $FFA7 ..TO CARTRIDGE MEMORY
3F5E 86      70        00133 LDA #$70 THEN BANK 8K FROM..
3F60 B7      FFA2      00134 STA $FFA2 ..EXTENDED MEMORY TO REPLACE
3F63 86      71        00135 LDA #$71 ..AND ANOTHER 8K
3F65 B7      FFA3      00136 STA $FFA3
3F68 7E      C000      00140 JMP $C000 AND JUMP THERE
             0000      00150 END

00000 TOTAL ERRORS
```

Listing 2: PAKXFER

```
10 WIDTH 32
20 PMODE 0:PCLEAR1:CLEAR 200,160
00
30 CLS
40 PRINT STRING$(32,"*");
50 PRINT "COCO 3 ROM FIX AND ROM
 PATCH"
60 PRINT "BY DAVID LIONELL DAWSO
N"
70 PRINT "COCO 1/2 CODE BY R. ES
POSITO"
80 PRINT STRING$(32,"*")
90 PRINT:PRINT
100 PRINT "MODE:"
110 PRINT "  A:PATCH 'ROMFIXED'
DISK FILE"
120 PRINT "  B:PATCH ROM CODE ON
 TAPE"
130 INPUT "*****WHICH";A$
140 IF A$<>"A" AND A$<>"B" THEN
100
150 IF A$="B" THEN 220
160 INPUT "DISK FILE NAME";FA$
170 LOADM FA$
180 IF PEEK(&H3F9A)<>&H0F THEN C
LS:PRINT"SORRY NOT CORRECT FORMA
T":END
190 GOSUB 300:'ADD PATCH
200 INPUT "SAVE <A>8K OR <B>16K
ON DISK";A$:IF A$="A" THEN SAVEM
 FA$,16200,24577,16200 ELSE SAVE
M FA$,16200,32751,16200
210 PRINT:PRINT"PATCHED VERSION
ON DISK":END
220 INPUT "TAPE FILE NAME";FA$
230 CLOADM FA$,&H8000
240 GOSUB 300:'COCO3 PATCH
250 GOSUB 410:'COCO1&2 PATCH
260 INPUT"DISK FILE NAME";FA$:FA
$=LEFT$(FA$,8)
270 INPUT "SAVE <A> 8K OR <B> 16
K";A$:IF A$="A" THEN SAVEM FA$,1
6200,24577,16200 ELSE SAVEM FA$,
16200,32751,16200
280 END
290 'COCO3 PATCH
300 FOR I=&H3F48 TO &H3F6A
310 READ A$
320 POKE I,VAL("&H"+A$)
330 NEXT I
340 DATA B6,80,FD,81,32,27,03,7E
350 DATA 3F,9A,1A,50,86,7A,B7,FF
360 DATA A6,86,7B,B7,FF,A7,86,70
370 DATA B7,FF,A2,86,71,B7,FF,A3
380 DATA 7E,C0,00
390 RETURN
400 'COCO1/2 PATCH
410 FOR I=&H3F9A TO &H3FFE
420 READ A$
430 POKE I,VAL("&H"+A$)
440 NEXT I
450 DATA 0F,71,1A,50,8E,80,0,A6,
84,B7,FF,DF,A7,80
460 DATA B7,FF,DE,8C,C0,0,26,F1,
B7,FF,DF,86,7E,B7
470 DATA A0,51,CC,A0,72,FD,A0,52
,CC,8E,9F,FD,A0,84
480 DATA CC,FE,7E,FD,A0,86,CC,A0
,93,FD,A0,88,7F,80
490 DATA 00,0F,71,86,7E,B7,A0,CB
,CC,3F,E3,FD,A0,CC
500 DATA 7E,A0,27,CC,C0,00,97,45
,CC,DF,FF,DD,41,CC
510 DATA 40,00,DD,47,CC,5F,FF,DD
,43,BD,AC,20,1C,AF
520 DATA 7E,C0,00
530 RETURN
```

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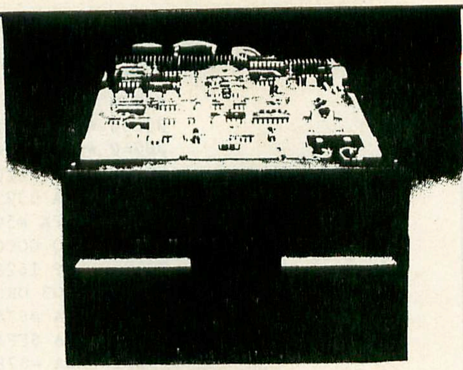

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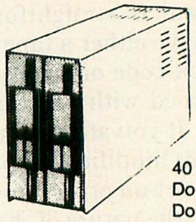

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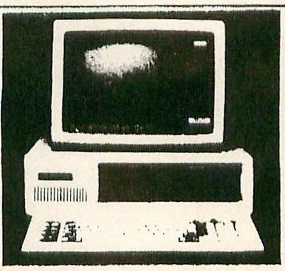

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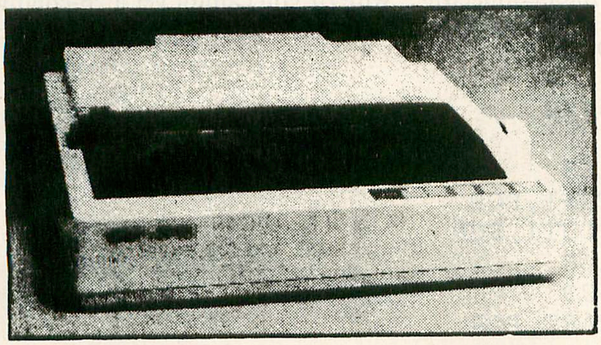

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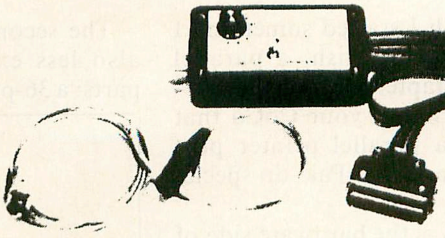

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Finishing the Printer Adapter

By Tony DiStefano
Rainbow Contributing Editor

Last month I started something I now have to finish, a parallel printer adapter for your CoCo — something internal to your CoCo that will give you a parallel printer port without using a Multi-Pak or special controller.

Last month was the hardware side of this two-part project, which I'll review quickly. A small PCB that goes inside your computer has three ICs on it and connects to the inside of the cartridge connector. It also has a 36-pin connector. This connector can be connected to any Centronics type parallel printer. The hardware uses two bytes to talk to the printer. The first, at $FF50, is the latch to which the character to be printed is located. The second, located at $FF58, is a readable bit that shows the state of the printer, busy or not busy. The data at the latch is auto-strobing, which means the second the data is latched, the printer is told about it. You don't have to strobe the printer separately.

This month I will do two things: first, I'll describe how to build (or buy) a printer cable; second, I'll describe the software required to drive this parallel port.

You can get the cable in one of two ways. The simple way is to run to your local Radio Shack and buy a cable. Just ask for a cable to connect a Model 100 computer to any Radio Shack parallel printer (Catalog Number 26-1409).

The second way is a bit harder but also less expensive. You need three parts: a 36-pin ribbon printer connector (Radio Shack carries it, but at a stiff price), a length of 26-conductor ribbon wire (if you cannot get a 26-conductor,

```
        NAM POUT

        ORG $0000

START   LDX $168
        STX PT2+1,PCR
        LEAX POUT1,PCR
        STX $168
        LDA #$39             RTS
        STA START,PCR
        RTS

POUT1   PSHS B
        LDB $6F
        CMPB #$FE
        PULS B
        BEQ POUT2            FOR PRINTER
PT2     JMP $CB4A

POUT2   TST $FF58
        BMI POUT2
        STA $FF50
        LEAS 2,S
        PSHS B
        CMPA #$0D            IS IT CR?
        BEQ POUT3            YES
        INC $9C              INC CHR COUNT
        LDB $9C              CHECK END OF PRINT LINE
        CMPB $9B             END?
        BLO POUT4            NO
POUT3   CLR $9C              RESET CHR COUNT
POUT4   PULS B,PC

        END
```

Figure 1: Driver routine for any CoCo

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

get a higher number and split the difference. A common ribbon wire available is a 25-wire. This will do just fine since the 26th wire is *not* used. Just make sure that the missing wire is not on the pin number 1 side), and a female 26-pin dual inline header. To assemble the cable, start by locating pin number 1 on both connectors. Usually, the ribbon wire will come with a red stripe on the side. Line up Pin 1 of one connector to the red stripe. Push the wire into the connector and crimp the connector. Be careful that the wires align up with the connector teeth. Next, do the same thing with the other connector. That's it, your cable is done. Now it's time to get into that "Do I really have to?" part of the project, yes, the software.

Deep in the ROMs of the CoCo lies software. This software is called BASIC, Extended BASIC and Disk BASIC. Also in these ROMs are drivers that control the computer. Reading the keyboard, displaying a character on the video screen, getting a file from disk and printing a character on a printer are all software functions built into these ROMs. These functions are sometimes called Basic Input Output Subroutines, or BIOS, for short.

In the case of the CoCo's printer routine, it is in the BASIC ROM. Without going into too many details, the printer routine has what is called a RAM HOOK. If you look in the "Machine Language Subroutines" section of your BASIC manual, you will find one routine that is called `CHROUT`. This routine will output a character to the device specified by the contents of a byte in memory. The value of that byte will determine which device the character will be sent to. If that value is -2 or $FE as a signed eight-bit integer, that character is destined for the printer. But before this character is sent to the printer routine, it goes through the RAM HOOK. This is a few bytes in RAM that, if changed, can re-route the character to your own driver. This is where my routine comes in.

> ***"With the proper driver, the parallel printer adapter would work with all OS-9 software."***

Look at Figure 1, the driver routine for my parallel printer port. It will work with any CoCo. I wrote it using the *Micro-Works* editor/assembler. You may have to change some things around if you use another package. The first part, called Start, initializes the software by changing the RAM HOOK to POUT1. It then puts an RTS at the beginning of the routine so it cannot be done again. The new printer routine starts at POUT1 and checks the device number to see if the character in question is for the printer. If it is not, the routine continues to where it would normally go had we not changed the RAM HOOK. If the character is for the printer, the routine then moves to POUT2, where the printer is tested to see if it is busy. If it is busy, the software waits in a loop until the printer is free. If the printer is not connected, the software will wait forever.

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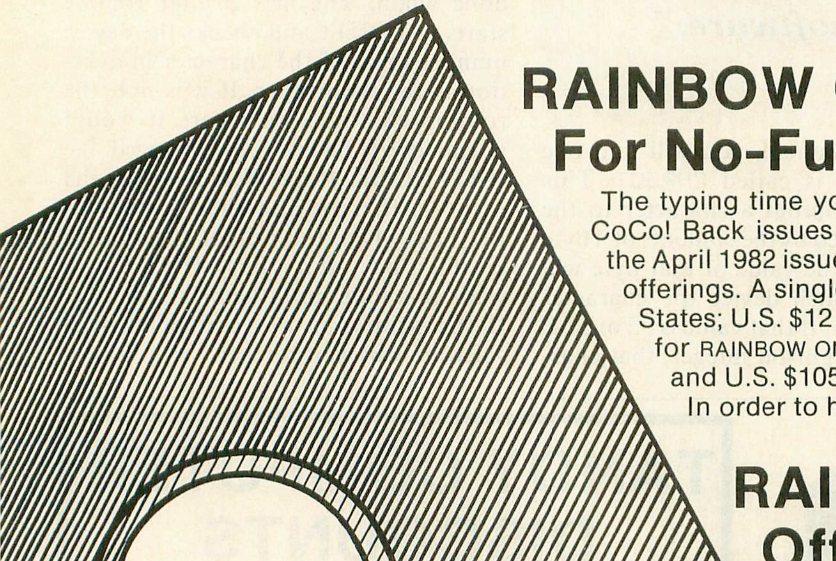

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After it is established that the printer is no longer busy, the software proceeds by sending the character to the printer. By now you would think that your job is finished. No way, there's a little more to go. First, we get rid of the return address, because the character has been processed and must return to whatever software called the printer routine to begin with, avoiding the serial printer routine.

To stay compatible with the regular printer routine, this software must do one more thing — deal with carriage returns. There are two variables used with the regular printer routine: character count and printer line length. Every time a character is output to the printer, the character count is incremented and checked with the printer line length. If it is equal, it is then cleared. When a carriage return is issued, the character count is again cleared. You may ask yourself what use this routine might have. Well, the printer routine itself does not use it, but other routines like `TAB` use these variables. After all this is taken care of, the routine is finished and returns to its caller.

A few notes to this program are necessary at this time. If you noticed, at the beginning of the routine there is an `ORG` statement. This tells the assembler where the software is to be loaded in memory. The value after the `ORG` statement is 0 to make things a little easier for the user. While the program will not function properly when it is assembled, calculation of the offset is made easier.

```
          ORG $A2F7

          FCB $21          CODE FOR BRN

          ORG $A2C3

POUT      TST $FF58        PRINTER BUSY
          BMI POUT         YES
          STA $FF50        PRINTER DATA
          JMP $A2DF        CONTINUE
```

Figure 2: Driver routine for CoCo 3 only

The loading address of a machine language consists of adding its regular address to the offset. If the regular address is 0, then the offset address becomes the loading address. It is up to the user to determine where this routine must end. Usually, machine language routines are loaded in the top portion of memory, protected by the `CLEAR` command. An offset address must be used, in any case. Another point to this driver is that while all BASIC programs should work fine, machine language programs that choose to ignore RAM HOOKS will not work. The reason is simple —the program does not use the hook; therefore, there is no way that the program will know you have added the extra hardware.

If you use a higher level of software such as OS-9, with the proper driver, the parallel printer adapter would work with all OS-9 software. But, unfortunately, I know little about OS-9 drivers. If there is someone out there who knows enough about it and can write such a driver, send it to me, via THE RAINBOW. I'll check it out, and if it works fine, I'll print it in a future issue.

Figure 2 is another printer driver with a twist. It works only with the CoCo 3. You see, the CoCo 3 always works in the all-RAM mode. When you turn the computer on, it transfers all the ROM data into RAM. While it is impossible to write to ROM, it is possible to write to RAM. This routine is in two parts. The first part is one byte long and checks to see if the serial printer is ready. We don't need this with the parallel port; this byte defeats that routine. The second part is the printer driver itself. It is not very long — it does not need to be. First of all, it is loaded directly on top of the old serial driver. It does not need to be relocated in memory, nor does it need to be hooked into the RAM HOOK. Next, it does not need to check to see if the character is for the printer; if the software gets this far, it has already determined that it is for the printer. And finally, it does not have to deal with carriage returns, because the rest of the routine does that for you. Another advantage to this is that more machine language programs will work, because it is at the address normally taken up by the serial driver.

Again, some notes for this driver are necessary. The assembler I used for this routine allows for more than one `ORG` value. Many assemblers allow this, but the area in between must not be filled with zeros if your assembler does not allow it. You can poke the value into memory. Enjoy your parallel printing!

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Galileo and the CoCo

By Debbie and Dennis H. Weide

Having taken science classes in school every year since elementary school, I always do a science project for the school science fair. Projects are due toward the end of the school year, usually in April or May. In the past, I've always waited until the last minute to get started and end up rushing to finish it. This year, however, I decided to start my project right after school let out last summer. Now, with a new school year in full swing, my project is finished.

This past summer, I was invited to attend a special summer science class taught by scientists from Sandia Laboratories. This class covered many aspects of science including computers and physics. I learned so much that I decided to base my science fair project on these two subjects. With a little bit of research, my CoCo and some hardware I built, I duplicated one of the world's greatest scientist's experiments.

The project works on any version CoCo 1 and 2 with or without disk drives. If you use disk drives, you must use a multipack interface. A 'Y' cable will not work. The PASCAL program automatically switches between disk and the timer circuit. Place the timer circuit in Slot 1 and the disk controller in Slot 4. Although the PASCAL timer program may not work on the CoCo 3, the BASIC program and timer circuit will work in the CoCo 2 mode. Those using a CoCo 3 can write their own assembly language timer program.

How Galileo Could Have Saved Time

One of the first things most students learn in a physical science course is that, air resistance aside, objects of different weights and sizes dropped from the same height will strike the ground at the same time. I'm sure you've heard of Galileo's experiments on free-falling objects at the Leaning Tower of Pisa. In an attempt to disprove Aristotle's theory that heavy objects fall faster than lighter objects, Galileo took two unequal weights to the top of the tower and dropped them. Much to everyone's amazement, the weights appeared to hit the earth at approximately the same time.

But Galileo believed that lighter objects fell faster, because they struck the ground slightly earlier than the heavier objects. Years after Galileo's death, a scientific explanation of this phenomenon was discovered. When a person releases two unequal weights from his hands, he cannot release them simultaneously no matter how hard he tries. Photographic evidence shows that he involuntarily releases the lighter object first, due to differential muscular fatigue. When holding two unequal weights, his hand tends to grip the heavier weight more tightly. Therefore, he will release the lighter object before the heavier one no matter how hard he tries to do otherwise.

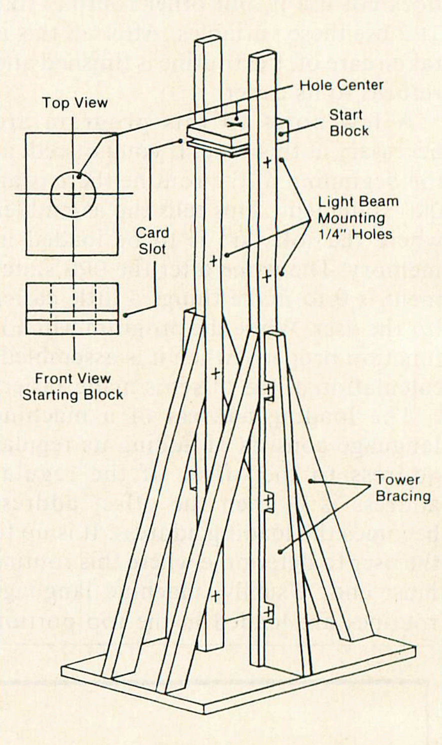

Figure 1: Tower Construction

Now, if Galileo had owned a CoCo, he could have proved Aristotle wrong in about an hour and saved himself years of research and experimentation. He could have dropped unequal weights from a smaller tower and clocked the time it took for each weight to fall. Although he could not have dropped

---

Debbie Weide is a junior at Manzano High School and lives in Albuquerque, New Mexico. She is a member of the Honor, Spanish Honor and Thespian societies. Her interests include drama, photography and window shopping. Her father, Dennis Weide, has contributed many articles to THE RAINBOW, but this is her first.

them at the same time, the experiment would be accurate because the weights would be dropped from exactly the same height and would fall the same distance each time.

Tower Construction

In order to duplicate Galileo's experiments (on a smaller scale), I built the tower shown in Figure 1. The crosses shown on the sides of the tower are the light beam mounting holes. They are ¼ inch in diameter, and on our tower, were spaced 6 inches apart.

If the tower is not plumb (level vertically), the object may not fall through both light beams. I solved this problem by bracing the tower and adding a small plumb bob for tower alignment. The starting block can be placed above any one of the light beams in order to test objects falling from different distances. The cross indicates the center of the hole where the marbles were placed. The card slot holds a piece of paper or a business card and is used to release the marble or ball. My tower was 3 feet tall, but you can make one to your own specifications.

The Hardware

Let's take a look at the event timer circuit. The circuit was built on a small PC board that plugs into the CoCo ROM port. Power is supplied by the computer. The complete circuit, shown in Figure 2, is laid out in five circuit blocks. I'll describe each block separately, and then explain how it relates to and works with the others.

Clock Circuit

The clock circuit uses a crystal-controlled TTL squarewave oscillator (IC1) to generate a 1 MHz signal. The output is fed to the three 74LS9O decade counters, IC2 through IC4. Each counter divides the input frequency by 10 so that output from IC4 is a 1 KHz squarewave. To count by hundredths and tenths of seconds, additional 74LS9Os can be added. Capacitors C1 through C4 are used to keep switching transients out of the power supply and are optional.

Trigger generator

The trigger generator uses two infrared emitting diodes (IRED's CR1 and CR2) and two phototransistors (Q1 and Q2) to generate the triggers required to start (CR1,Q1) and stop (CR2,Q2) the computer program. Because CR1 is biased to conduct, infrared light is emitted as long as power is applied to the circuit. The IR beam striking the base of Q1 causes the transistor to conduct placing a logic low signal on Pin 1 of IC5. When the light beam is broken, Q1 stops conducting and the output to Pin 1 of IC5 goes high. When the beam strikes the base of Q1 again, the transistor will conduct and its output will go low. The circuit of CR2-Q2 is identical to CR1-Q1.

Trigger Shaper

The trigger shaper circuit includes one 74LSO4 (IC5) and two 555 timers (IC6 and IC7). IC5 inverts the pulses from the trigger generator, while IC6 and IC7 shape and lengthen the start and stop triggers. Pin 2 is the input to the 555 timer circuit. While this input is high, the output at Pin 3 remains low. When the input goes low, a trigger whose pulse width is determined by R5 and C7 is present at the output. This trigger has a fixed duration independent of the input trigger duration.

Gate Generator

The gate generator uses a 74LS00 Quad NAND gate (IC8) to generate a

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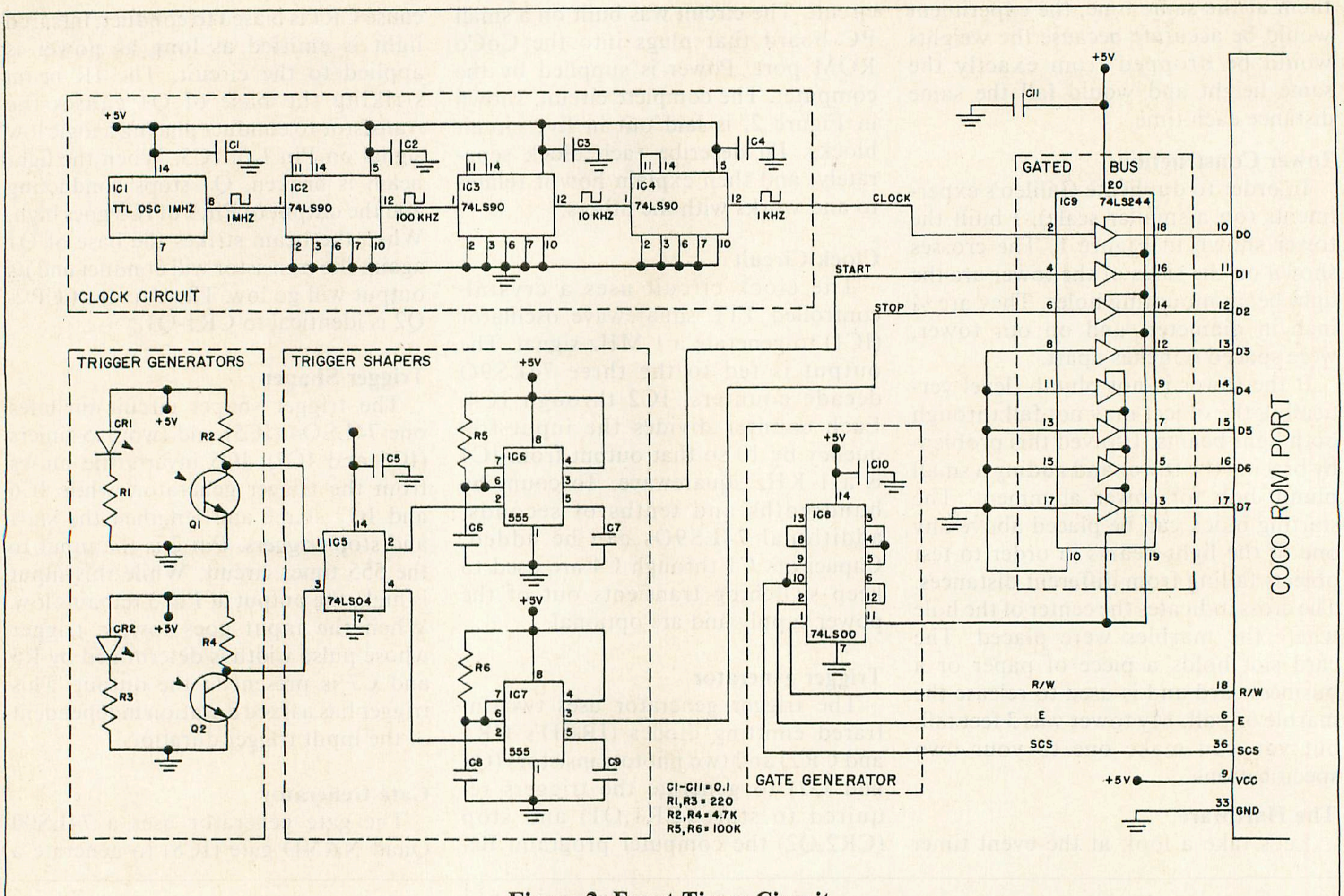

CLOCK CIRCUIT
+5V
IC1 TTL OSC 1MHZ
IC2 74LS90
IC3 74LS90
IC4 74LS90
1MHZ
100 KHZ
10 KHZ
1 KHZ
C1
C2
C3
C4
CLOCK
START
STOP
TRIGGER GENERATORS
TRIGGER SHAPERS
CR1
CR2
R1
R2
R3
R4
Q1
Q2
IC5 74LS04
C5
R5
R6
IC6 555
IC7 555
C6
C7
C8
C9
C10
C11
IC8 74LS00
GATE GENERATOR
GATED BUS
IC9 74LS244
D0
D1
D2
D3
D4
D5
D6
D7
R/W
E
SCS
VCC
GND
COCO ROM PORT
C1-C11 = 0.1
R1,R3 = 220
R2,R4 = 4.7K
R5,R6 = 100K

Figure 2: Event Timer Circuit

gate from the R/$\overline{W}$, E and SCS leads. The computer uses these leads to access address $FF40 for reads and writes. IC8 decodes the state of these leads and generates a low on Pin 11 whenever the computer attempts to read address $FF40. Figure 3 shows a truth table for IC8.

R/$\overline{W}$	E	SCS	OUT
H	H	H	H
H	H	L	L
H	L	H	H
H	L	L	H
L	H	H	H
L	H	L	H
L	L	H	H
L	L	L	H

Figure 3: Gate Generator Truth Table

Gated Bus Buffer

The gated bus buffer (IC9) is a tri-state octal buffer used to isolate the clock and trigger outputs from the computer until the computer is ready to read them. While the gate from IC8 is high, the buffer is in the high impedance state and the event timer circuit is isolated from the computer data bus. When the gate goes low, IC9 is switched on and information from the timer circuit is passed to the computer data bus where it will be read by the computer. The clock, start and stop bits are sent to the data bus on bits 0 through 2. Bits 3 through 7 are held low (grounded) for this circuit but, if desired, can be used for other inputs. When the gate lead again goes high, the timer circuit returns to its high impedance state isolating it from the computer data bus.

Circuit Construction

Circuit construction can be point-to-point or wire-wrapped. I prefer wire wrapping because it makes the circuit easier to modify. Remember to keep the leads as short as possible. I used a small board with a card edge connector (see Parts List, Figure 4) to plug into the ROM port. Any double-sided card edge connector with at least 40 tabs spaced .1 inch apart can be cut to fit. Figure 4 is a parts list with possible sources. Checking around your area for surplus or discount parts houses may save you lots of money.

The Software

The software for the experiment consists of two programs (listings 1 and 2). Listing 1 is the PASCAL source code for the event timer program. Since BASIC is an interpreted computer language, it executes too slowly to allow fast timing speeds. To ensure accuracy of time measurement, the computer must be able to recognize each half-cycle of the clock squarewave.

We are using a 1 KHz clock signal, so the computer must read the clock pulse at least 2,000 times per second to maintain accuracy. This isn't really that hard, but we are executing additional instructions between each clock read so the number of times we can read the clock each second is reduced. The more often the clock is read, the more accurate our timer circuit will be. I wrote the timer portion of the program using Deft PASCAL, a compiled language that produces relocatable machine code.

Listing 2 is the BASIC program that allows you to time 10 events. It stores the results in memory for final computation. A screen or printer output is provided. I used BASIC for this portion of the project so that I can easily modify the program to perform different experiments.

Using the Programs

First, load the BASIC program by typing `RUN "TIMER"`. The BASIC program then loads the machine language program. The program will ask whether you want the results of the 10 trials to be displayed on the screen or printed on the printer. After you've made your selection, you're ready to drop the first object. When it passes through the first light beam, a small cross will appear in the upper left corner of the screen to indicate that the computer has begun timing. When the object passes through the last light beam, the computer stops counting and displays the time. It asks if the event was valid. If so, type a `Y` and the computer will save the event; if it isn't, type `N` so that the computer will discard the event. When 10 valid events have been completed, the computer will throw out the highest and lowest readings and print the average of the eight remaining values.

Desig.	Part #	Quan.	Price	Source
C1-C11	272-1069	11	2/.79	Radio Shack
CR1-CR2	276-143	2	1.49	Radio Shack
IC1	OSC 1.000	1	3.19	Jameco
IC2-IC4	74LS90	3	.49	Jameco
IC5	74LS04	1	.35	Jameco
IC6-IC7	NE555V	2	.29	Jameco
IC8	74LS00	1	.29	Jameco
IC9	74LS244	1	.79	Jameco
Q1-Q2	276-145	2	.89	Radio Shack
R1,R3	271-015	2	2/.19	Radio Shack
R2,R4	271-030	2	2/.19	Radio Shack
R5,R6	271-045	2	2/.19	Radio Shack

Circuit Board with connector Part # JE413 modified to fit ROM Port available from Jameco Electronics, 1355 Shoreway Blvd., Belmont, CA 94002 for $7.95

Figure 4: Parts List

The Whole Circuit and Program

Now let's discuss the entire circuit and program. The clock circuit continuously generates a 1 KHz squarewave signal and feeds it to the gated bus buffer. The program instructs the computer to read address $FF40 (the timer circuit) at least 2,000 times per second by setting the R/$\overline{W}$ and E leads high and the SCS lead low each time (refer to Figure 3 again). The gate generator enables the gated bus buffer for each read cycle, allowing the timer circuit information to pass to the computer data bus. As long as the start bit remains low, the program disregards the clock and stop leads.

When an object breaks the light beam

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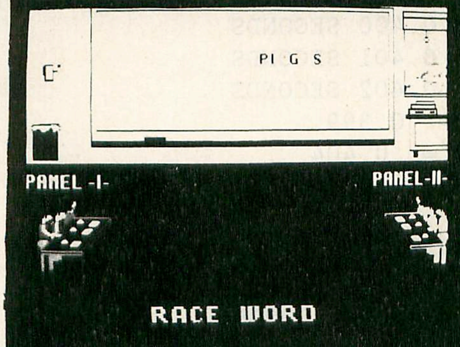

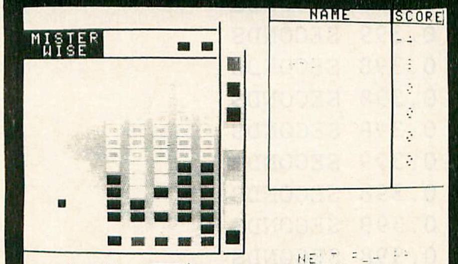

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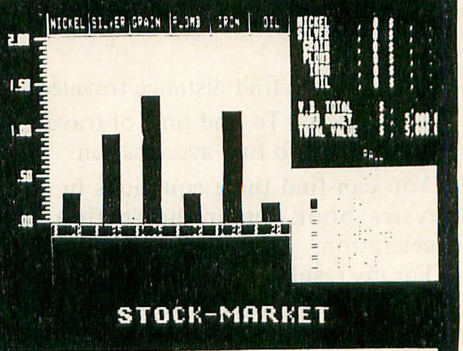

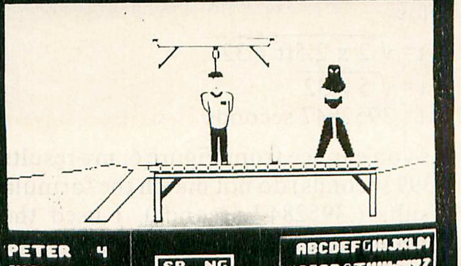

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from CR1, IC6 generates a 1 millisecond high pulse and sends it to Pin 4 of IC9. The computer reads this start pulse and counts the number of times the clock pulse changes state from low to high. When the object breaks the light beam emitted by CR2, IC7 sends a stop pulse to IC9. The computer then stops counting clock pulses, passes the results to BASIC and gets ready for the next event. After 10 valid events, the program exits to the BASIC program where all mathematical calculations and output take place.

My Experiment

My experiment consisted of dropping a steel ball and two marbles (see Figure 5 for dimensions) from the homemade tower. I used a business card in the card slot to support the marble. First, I dropped the marbles and the steel ball from the tower 10 times each. The results are shown in Figure 6. Even though the steel ball is almost four times heavier than either of the marbles, their average times were extremely close. So, it can be assumed that if the human hand could release both weights simultaneously, they would hit the ground at the same time.

Prove Your Results With Equations

After running a few tests, I was curious to know if my readings were accurate. That is, I wanted to make sure I wasn't breaking any laws of nature or gravity. The easiest way to verify the results is to plug the values from my tests into the formulas below and check the results.

$d=.5at^2$ To find distance traveled
$t=\sqrt{2d/a}$ To find time of travel
$a=2d/t^2$ To find acceleration

You can find these equations in any physics book under the section on acceleration.

For my results, I used the values from Figure 6 and plugged them into the formula for time. The results are shown below.

$t=\sqrt{2 \times 2.5\text{ft} / 32}$
$t=\sqrt{5 / 32}$
$t=.3952847$ seconds

As you can see from Figure 6, my results (.399 seconds) do not match the formula results (.3952847 seconds). I used the formula below as a cross check.

$d=.5at^2$
$d=.5 \times 32 \times .399^2$
$d=16 \times .159201$
$d=2.547216$ feet

Close, but no cigar.

	Blue Marble	Multicolor Marble	Steel Ball
Weight (oz.)	.1383	.1380	.44224
Diameter (in.)	.54	.52	.55
Avg. Time (sec.)	.399	.401	.399

Figure 5: Size and Weight Statistics

```
   RESULTS OF EXPERIMENTS WITH BLUE MARBLE
      THE TEN VALUES ARE AS FOLLOWS:
      EVENT # 1          0.398 SECONDS
      EVENT # 2          0.400 SECONDS
      EVENT # 3          0.399 SECONDS
      EVENT # 4          0.398 SECONDS
      EVENT # 5          0.399 SECONDS
      EVENT # 6          0.398 SECONDS
      EVENT # 7          0.399 SECONDS
      EVENT # 8          0.398 SECONDS
      EVENT # 9          0.399 SECONDS
      EVENT # 10         0.398 SECONDS
      THE LOW VALUE =  0.398
      THE HIGH VALUE =  0.400
      8 EVENT AVERAGE =  0.399

RESULTS OF EXPERIMENTS WITH MULTICOLOR MARBLE
      THE TEN VALUES ARE AS FOLLOWS:
      EVENT # 1          0.404 SECONDS
      EVENT # 2          0.403 SECONDS
      EVENT # 3          0.400 SECONDS
      EVENT # 4          0.400 SECONDS
      EVENT # 5          0.404 SECONDS
      EVENT # 6          0.400 SECONDS
      EVENT # 7          0.399 SECONDS
      EVENT # 8          0.400 SECONDS
      EVENT # 9          0.401 SECONDS
      EVENT # 10         0.402 SECONDS
      THE LOW VALUE =  0.399
      THE HIGH VALUE =  0.404
      8 EVENT AVERAGE =  0.401

   RESULTS OF EXPERIMENTS WITH STEEL BALL
      THE TEN VALUES ARE AS FOLLOWS:
      EVENT # 1          0.399 SECONDS
      EVENT # 2          0.399 SECONDS
      EVENT # 3          0.399 SECONDS
      EVENT # 4          0.398 SECONDS
      EVENT # 5          0.398 SECONDS
      EVENT # 6          0.398 SECONDS
      EVENT # 7          0.399 SECONDS
      EVENT # 8          0.398 SECONDS
      EVENT # 9          0.399 SECONDS
      EVENT # 10         0.398 SECONDS
      THE LOW VALUE =  0.398
      THE HIGH VALUE =  0.399
      8 EVENT AVERAGE =  0.399
```

Figure 6: Results of Experiments

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Errors and Inconsistencies

The computer is accurate to .001 seconds, so I had to find my error. I started by remeasuring the dimensions of my tower. After measuring from the center of the top IRED beam to the center of the bottom one, I found that I was almost ½-inch over the planned 2 feet 6 inches that was supposed to separate the light beams. That accounted for most of my error. In the final analysis, my results were within .001 seconds of what the formula said they should be.

Here are some other things to consider when verifying your results. The starting block must be placed about ¼-inch above the light beam so the beam will break only after the object is released. This means that the object will have already fallen ¼-inch before it breaks the light beam. Because an object gains speed as it falls, it has already picked up speed before the timer started counting.

The weather and environment can also affect the results. Some of my experiments were conducted in dry weather (humidity=6%) and some in humid weather (humidity=60%). The readings, much to my amazement, were different. In humid weather the times were slower than in the drier weather. I have no scientific explanation for this, but it would make an interesting science project!

Lastly, you should know that the rate of acceleration of a falling object due to gravity is not always exactly 32 feet per second. At different latitudes it can equal 32.1 or even 32.2 feet per second. For instance, an object falling at the equator does not fall as fast as the same object falling at the North Pole. Figure 7 shows the rate of acceleration for various latitudes.

Location	Degrees Normal	Elevation (Meters)	Acceleration
Canal Zone	9	0	32.0944
Jamaica	18	0	32.1059
Bermuda	32	0	32.1548
Denver	40	1638	32.1393
Cambridge	42	0	32.1652
Greenland	70	0	32.2353

Figure 7: Rate of Acceleration for Given Latitudes

Other Practical Uses

This project can be used to time events other than falling objects. If built in the horizontal position, it can be used to time objects traveling horizontally. For example, it could time how fast a model race car or train is going. If the timer and the car are built to scale, scale distances and speeds can be calculated using the formula S=D/T where S is the scale speed, D is the scale distance traveled and T is the time required to travel the distance. Note that since PASCAL stores the results of each event in a 16-bit word when passing it to BASIC, the program can read only 65,535 clock cycles. Because we're measuring .001 second increments, the maximum amount of time we can clock accurately is 65.535 seconds (65,535/1,000) or just over one minute. By adding another 74LS90 to the timer circuit, we can count .01 second increments and increase the maximum clock time to 655.35 seconds (65,535/100).

This project is not intended to provide step-by-step instructions, but was written to give you ideas for using your CoCo for your next science fair project. Build the circuit and elaborate on it. Experiment using different materials, different distances and different conditions. Most of all, have fun with it!

(Questions about this program may be directed to the authors at 14201 Marquette Dr. NE, Albuquerque, NM 87123. Please enclose an SASE when writing for a reply.) ☐

Editor's Note: The Deft PASCAL source codes for the Timer program will be included on this month's RAINBOW ON DISK under the filename `TIMER.PAS`.

Listing 1: `TIMER.BIN`

```
PROGRAM TIMER(INPUT,OUTPUT);

(*  EVENT TIMER PROGRAM  *)
(*  WRITTEN BY D. WEIDE  *)
(*     COPYRIGHT 1987    *)
(*                       *)
(*  START ADDRESS $4E20  *)
(*  END ADDRESS   $642F  *)
(*  EXEC ADDRESS  $4E20  *)

CONST ADDRESS=65407;

VAR X,TIME,CURRENTCLOCK,LASTCLOCK:INTEGER;
    RESULT:REAL;

BEGIN
  X:=BYTE[1024];
  PAGE;
  CURSOR(38);
  WRITELN('EVENT TIMER PROGRAM');
  CURSOR(72);
  WRITELN('EVENT NUMBER ',X:2);
  BYTE[ADDRESS]:=0;
  LASTCLOCK:=0;
  TIME:=0;

  (*   CHECK BIT 2 (START BIT)         *)
  (*   FOR HIGH. DISCOUNT CLK BIT HIGH *)

WHILE (BYTE[$FF40]<2) OR (BYTE[$FF40]>3) DO
;
X:=0;
BYTE[$0400]:=$2A;
WHILE X=0 DO BEGIN
  CURRENTCLOCK:=BYTE[$FF40];
  CASE CURRENTCLOCK OF

  (*   IF CLOCK LOW, RESET             *)
  (*   LASTCLOCK FLAG                  *)

    0,2:LASTCLOCK:=0;

  (*   CHECK CLOCK BIT HIGH            *)
  (*   INCREMENT CURRENTCLOCK          *)
  (*   IF HIGH                         *)

    1,3:BEGIN
      IF LASTCLOCK=0 THEN BEGIN
        TIME:=TIME+1;
        LASTCLOCK:=1;
      END;
    END;

  (*   CHECK IF STOP BIT SET           *)

  (*   IF SET, EXIT CLOCK READ          *)
  (*   DISREGARD START BIT              *)

    4,5:X:=1;
    (*   CHECK CLOCK AND STOP BIT          *)
    (*   SET. IF BOTH ARE SET, INCREMENT *)
    (*   CLOCK AND EXIT CLOCK  READ        *)

      5,7:BEGIN
        IF LASTCLOCK=0 THEN BEGIN
          TIME:=TIME+1;
          X:=1
        END;
      END
    END;
  END;
```

```
  BYTE[ADDRESS]:=51;

  (*   PRINT RESULTS AND STORE AT          *)
  (*   ADDRESS 30208 AND 30209             *)

  WORD[$7600]:=TIME;
  RESULT:=TIME;
  RESULT:=RESULT/1000;
  CURSOR(355);
  WRITELN(RESULT:7:3,' SECONDS ELAPSED')
END.
```

Listing 2: TIMER.BAS

```
100 '        EVENT TIMER PROGRAM
200 '        BY DENNIS H. WEIDE
300 '         & DEBBIE E. WEIDE
400 '          COPYRIGHT 1987
450 POKE 150,1:'BAUD RATE
500 CLEAR 200,19999
600 CLS:PRINT:PRINTTAB(10)"EVENT
 TIMER":PRINTTAB(6)"BY DENNIS H.
 WEIDE"
700 PCLEAR1
800 HI=0
900 DIM EV(10):CT=1
1000 PRINT:PRINT"YOU  WILL  TIME
 10 EVENTS, THROWOUT THE HIGH AN
D LOW VALUES  ANDAVERAGE THE REM
AINING EIGHT."
1100 PRINT:INPUT"RESULTS TO sCRE
EN OR pRINTER>";DEVICE$
1200 IF DEVICE$="P" THEN DEVICE=
-2 ELSE DEVICE=0
1300 LOADM"TIMER"
1400 PRINT:PRINTTAB(5)"PRESS <EN
TER> TO BEGIN";
1500 SOUND 100,1
1600 LINE INPUT Z$
1700 POKE 1024,CT:EXEC 20000
1800 PRINT:PRINTTAB(3)"WAS THIS
A VALID EVENT?";
1900 E$=INKEY$:IF E$="" THEN 190
0
2000 IF E$="Y" THEN CT=CT+1:EV(C
T)=PEEK(&H7600)*256+PEEK(&H7601)
2100 IF CT=10 THEN 2200 ELSE 170
0
2200 CLS:PRINT#DEVICE,TAB(1)"THE
 TEN VALUES ARE AS FOLLOWS:"
2300 FOR X=1 TO 10:PRINT#DEVICE,
TAB(1)"EVENT #";X;TAB(15);"";
2400 PRINT#DEVICE,USING "##.###
SECONDS";EV(X)/1000:NEXT X
2500 FOR X=1 TO 10:IF EV(X)>HI T
HEN HI=EV(X)
2600 NEXT X
2700 LO=HI
2800 FOR X=1 TO 10
2900 IF EV(X)<LO THEN LO=EV(X)
3000 NEXT X
3100 PRINT#DEVICE,USING " THE LO
W VALUE = ##.###";LO/1000:PRINT#
DEVICE,USING " THE HIGH VALUE =
##.###";HI/1000
3200 FOR X=1 TO 10:IF EV(X)=LO T
HEN LO=X
3300 IF EV(X)=HI THEN HI=X
3400 NEXT X
3500 TL=0
3600 FOR X=1 TO 10:IF X=LO OR X=
HI THEN 3800
3700 TL=TL+EV(X)
3800 NEXT X
3900 PRINT#DEVICE,USING " 8 EVEN
T AVERAGE = ##.###";(TL/1000)/8
```

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Compression Filters in Saving and Restoring Graphics Screens

By Peter Dibble

I wasn't at all happy with the speed of the programs I wrote to save and restore graphics screens. About four and a half minutes to save a screen to disk is dreadful. Three and three quarters minutes to restore the screen is even worse. Both programs need help, but since I wrote the program to dump the screen to disk first, I'll fix it first.

I tried fiddling with the screen dump program in its BASIC09 code and got some improvement out of it, maybe 20 or 30 seconds. Since I was looking for a four-fold improvement, I needed to try something else.

Recoding the program in C might have done the trick. C programs are always faster than similar BASIC09 code. However, those of you with C compilers have probably already done the translation, and the people without C wouldn't want to type in the executable file for the resulting program. (C programs usually generate big modules.)

Once a BASIC09 or C program is as fast as possible, we usually turn to assembly language. Recoding our entire program in assembly language would be the leave-no-stone-unturned way to speed up the program, but it would be wasteful. Most of the screen dump program makes only a tiny contribution

Listing 1: `RLSqsh.CDump`

```
 1: 87CD 00C8 000D 1181 E000    135708.
 2: 1408 D152 4C53 7173 E801    49877.
 3: 0F01 5F0F 0230 C904 099F    23689.
 4: 074F DD05 3049 9F03 8D29    56727.
 5: 9701 8D25 250F 9101 2607    100655.
 6: C10F 2403 5C20 F18D 0920    113454.
 7: ED8D 058D 6E10 3F06 5858    171672.
 8: 5858 DA01 8D49 C600 9701    103119.
 9: 390D 0226 118D 1725 0C97    38507.
10: 0044 4444 4484 0F03 021C    34916.
11: FE39 9600 20F5 4310 3F06    169516.
12: 9C03 2618 3404 8600 108E    90014.
13: 0400 3049 103F 8925 0D1F    15685.
14: 2031 8B10 9F03 3504 4FA6    53644.
15: 8039 C1D3 26D8 4335 8434    124072.
16: 129E 0710 9E05 108C 0400    57416.
17: 2602 8D0E E780 9F07 3121    49783.
18: 109F 0535 9210 9E05 30C9    59437.
19: 0409 8601 103F 8A25 AD10    24702.
20: 8E00 0010 9F05 39A5 3B21    80163.
21:                             .0
```

Listing 2: `SaveImage`

```
PROCEDURE SaveImage
 0000       DIM FileName:STRING[99]
 000C       INPUT "Image file name: ",FileName
 0025       RUN compress(FileName)
 002F       END
```

Peter Dibble has a bachelor's degree in chemistry and is currently a graduate student in computer science. He has worked as an applications programmer, systems programmer and as the user services assistant director for the University of Rochester Computing Center. With Dale Puckett, he is co-author of The Complete Rainbow Guide to OS-9 *and the first volume of* The Complete Rainbow Guide to OS-9 Level II.

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to the program's run time. Even if the translation to assembly language reduced the time of the unimportant parts of the program to zero, it would make practically no difference in the program's speed. The most efficient way to use assembly language is to choose the parts of the program that use the most time and recode only them.

The most expensive part of the screen dump program is the section where it compresses the buffer and writes it to disk. The program seems to spend more than 75 percent of its time here. I decided that replacing it with assembly language should make a big difference to the program's speed — maybe close to the factor of four that I wanted.

It turns out that the part of the program I chose to improve does run length encoding. The nyble encoding method I use is specialized, but not so specialized that this program is the only one you would ever want to use it for. In fact, it looks like it would be a good program to have around. Unfortunately, subroutines for BASIC09 programs are of no use without other programs to call them.

Compression Filter

The easiest way to write a run-length encoding program is as a filter, a program that reads from standard input and writes transformed data to standard output. Since all OS-9 programs start with standard input and standard output open, you don't need to worry about filters having filenames and opening files. Filters got their name because they are often inserted in pipes where they "filter" data.

BASIC09 programs can call filters. It takes a little work and costs a little time, but it lets us use a run-length encoder filter instead of a subroutine. It also moves the filter into an address space separate from the rest of the program. If we were tight for memory, the second address space might be an advantage.

My first filter was simple, but slow. It read and wrote one byte at a time, and the OS-9 overhead was killing the program. My second attempt read and wrote 100-byte buffers. It was much faster.

The best size for the buffer is hard to choose. Every increase in buffer size makes the program run faster, but after the buffers reach about 100 bytes, further increases don't make much difference. On the other hand, the CoCo hands out memory in 8K chunks; so a program that uses only a few hundred bytes is wasting the rest of the 8K. I

```
PROCEDURE Compress
 0000       PARAM OutFileN:STRING[99]
 000C       DIM OutPath:BYTE
 0013       DIM OutPipe:BYTE
 001A       DIM buffer(7680):BYTE
 0026       DIM section:INTEGER
 002D       DIM position:INTEGER
 0034       DIM WinType,horiz,vert:INTEGER
 0043
 0044       CREATE #OutPath,OutFileN:WRITE
 0050       RUN GetWinAttr(1,WinType,horiz,vert)
 0067
 0068       REM Write the window attributes into the image file
 009A       PUT #OutPath,WinType
 00A4       PUT #OutPath,horiz
 00AE       PUT #OutPath,vert
 00B8
 00B9       RUN MakPipe("RLSqsh",OutPipe,OutPath)
 00D1
 00D2       FOR section:=1 TO 4
 00E2         REM get part of the screen image
 0101         RUN getbuffer(1,buffer,section)
 0113         REM write the image data to the compression program
 0145         PUT #OutPipe,buffer
 014F       NEXT section
 015A
 015B       CLOSE #OutPath,#OutPipe
 0166       END

PROCEDURE GetWinAttr
 0000       PARAM Window:BYTE
 0007       PARAM typecode:INTEGER
 000E       PARAM horiz,vert:INTEGER
 0019       TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 003E       DIM regs:registers
 0047       regs.a:=Window
 0053       regs.b:=$93
 005F       RUN syscall($8D,regs)
 006D       IF LAND(regs.cc,1)=1 THEN
 007F         ERROR regs.b
 0087       ENDIF
 0089       typecode:=regs.a
 0094       IF typecode<5 THEN  \REM not a graphics window
 00B8         ERROR 183 \REM illegal window type
 00D2       ENDIF
 00D4       FOR i:=5 TO typecode
 00E7         READ horiz,vert
 00F0       NEXT i
 00FB       END
 00FD       DATA 640,192
 0108       DATA 320,192
 0113       DATA 640,192
 011E       DATA 320,192

PROCEDURE MakPipe
 0000       REM For a process with its standard output directed to
 0035       REM a given path and its standard input coming from a pipe.
 006F       PARAM Pgm:STRING
 0076       PARAM InPath:BYTE \(* input for the new program
 0099       PARAM OutPath:BYTE \REM Output for the new program
 00BD       TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 00E2       DIM regs:registers
 00EB       DIM tmp,OldIn,OldOut:BYTE
 00FA
 00FB       REM Fix standard output
 0111       regs.a=1
 011C       RUN syscall($82,regs) \REM dup standard output
 0140       OldOut:=regs.a
 014B       CLOSE #1
 0150       regs.a:=OutPath
 015C       RUN syscall($82,regs) \REM dup the output path into std out
 018D
 018E       REM Fix standard input
 01A3       regs.a=0
 01AE       RUN syscall($82,regs)
 01BC       OldIn:=regs.a
 01C7       CLOSE #0
 01CC       OPEN #tmp,"/pipe":UPDATE
 01DC
 01DD       REM Now standard input and output are redirected as they
 0214       REM should be.  Fork the program
```

```
0233        regs.a:=0
023E        regs.b:=0
0249        regs.x:=ADDR(Pgm)
0257        regs.y:=0
0262        regs.u:=0
026D        RUN syscall($03,regs) \REM fork
0282
0283        REM now the process is running.
02A1        REM clean up after it
02B5        regs.a:=0
02C0        RUN syscall($82,regs) \REM dup the new stdin
02E2        InPath:=regs.a \REM save the pipe
02FD        CLOSE #0
0302        regs.a:=OldIn
030E        RUN syscall($82,regs) \REM dup to restore the old standard input
0344        CLOSE #OldIn
034A
034B        REM now restore the old standard output
0371        CLOSE #1
0376        regs.a:=OldOut
0382        RUN syscall($82,regs) \REM dup
0396        CLOSE #OldOut
039C        END


PROCEDURE GetBuffer
 0000       PARAM Window:INTEGER
 0007       PARAM buffer(7680):BYTE
 0013       PARAM section:INTEGER
 001A       TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 003F       DIM regs:registers
 0048       DIM i,group:INTEGER
 0053       DIM position:INTEGER
 005A       DIM pointer:INTEGER
 0061       BASE 0
 0063
 0064       RUN syscall($0C,regs) \REM get process id
 0083       group:=regs.a
 008E       position:=48*(section-1)
 009C       RUN gfx2(Window,"get",group,1,0,position,639,48)
 00C3
 00C4       regs.a=1
 00CF       regs.b=$84
 00DB       regs.x=group*256+1
 00EE       regs.y=1
 00F9       RUN syscall($8E,regs) \REM map in "get" buffer
 011D       IF LAND(regs.cc,1)<>0 THEN  \REM an error
 013B         ERROR regs.b
 0143       ENDIF
 0145
 0146       pointer:=regs.x \REM an optimization
 0163       FOR i:=regs.y-1 TO 0 STEP -1
 0180         buffer(i):=PEEK(pointer+i)
 0191       NEXT i
 019C
 019D       regs.x=group*256+1
 01B0       regs.y=0
 01BB       RUN syscall($8E,regs) \REM unmap the "get" buffer
 01E2       RUN gfx2("killbuff",group,1)
 01FA       END
```

settled on 1K buffers, but that still leaves plenty of wasted space. I probably should have used even more memory for the buffers.

When I stitched the filter to the screen dump program, the result ran in about a minute and a quarter (on my test screen. It gives a different performance on different data). I wish it were faster, but I'm not offended by the performance any more.

Pipes

Unless you are comfortable with pipes, the `MakPipe` procedure may be the strangest part of the `SaveImage` program. The goal of the procedure is to save the current standard input and output paths and replace them with the patch we want the filter to have. When the paths are right, we fork the filter. The last part of the procedure gives the calling procedure a path number for the pipe and puts the standard paths back the way they were when `MakPipe` was called.

The `I$Dup` system call gets a lot of use in `MakPipe`. You won't see it much except when a program is fooling with the standard paths. `Dup` gives a path a new path number, but it doesn't change the path in any way or touch the old path number. `MakPipe` uses it to save a path when it needs to borrow its path number.

`MakPipe` is mostly several repetitions of code like:

```
dup path 0 into x
close path 0
open /pipe
```

This saves the current path 0 (standard input) in x and replaces it with a pipe. The pipe file goes in path zero because OS-9 always uses the lowest free path number for a new path.

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Barden's Buffer

Taking Your Printer to the Limit

By William Barden, Jr.
Rainbow Contributing Editor

Back in the good old days of the Radio Shack Model I, a printer didn't have many bells and whistles. As a matter of fact, you were lucky if the printer did anything more than print listings in uppercase. Today, we have a different situation.

The DMP-130 I use with my CoCo is just *loaded* with all kinds of options — proportionally spaced characters, superscripting, boldface printing, and compressed printing, to name a few. As a matter of fact, the darn thing can even emulate an Epson/IBM printer! But using a printer to full advantage is tedious — there's a whole new printer language to learn and no tools to help. In this column we'll take a look at some of the things you can and can't do with your printer and how to learn that mysterious language.

Radio Shack Printers

First, a brief note about why Radio Shack printers are the way they are. They are very prolific creatures, spawning at a rate of about five per year. Unfortunately for the little critters, they die out after a brief life — usually only three years or so (although some have been known to live for 10 years or more). Their short life spans are due to the appearance of newer printers with more and more capabilities at lower and lower prices.

Early in the game, before IBM knew microcomputers were hot, Radio Shack established their own printer language, called a "control code sequence." A current name for this is "Tandy character set." At about the same time, Epson, an aggressive printer manufacturer, established its own standard set of characters and control codes.

Things went along smoothly until the IBM PC became a dominant force in the microcomputer market. IBM used an Epson printer as a standard IBM graphics printer, sticking their own label on the unit, and changing a few minor features.

When Tandy started stamping out IBM PC clones, they had a problem. Their older printers used the Tandy character set and control codes, but not the IBM/Epson codes. Since most printer features are implemented in firmware in the printer, however, the solution was easy — simply make the two character sets/control code sequences switch-selectable. And that's what they did. Current Tandy printers will run either in IBM/Epson mode or in Tandy character mode by setting DIP switch settings on the printer, or even under program control.

In addition, many Tandy printers allow for either serial or parallel I/O. Serial I/O is used on the CoCos, as you know, while parallel I/O is used on Tandy MS-DOS (IBM-compatible) systems.

IBM's vs. Tandy's Character Set

The two character sets, IBM and Tandy, are mutually exclusive, having very few similarities in the control codes. Certainly, there's no problem in printing plain text in either set, but we'd like to do more than that. The biggest difference between the two sets is in graphics mode. Tandy has historically used seven dots per graphics column, while IBM/Epson uses eight dots per graphics column. Both accomplish the same thing, but it's a little harder to work with numbers that are not powers of two in graphics. For example, if you wanted to write a screen dump program for the Hi-Res 640-by-192 mode on the CoCo 3, you'd have 24 graphics columns vertically in IBM/Epson mode, but $^{192}/_{7} = 27^{3}/_{7}$ columns in Tandy mode. CoCo software, however, is geared more to the Tandy character set. Also, the Tandy character set/control code sequence affords a few more niceties. For that reason, we'll stick with the Tandy character set in this column.

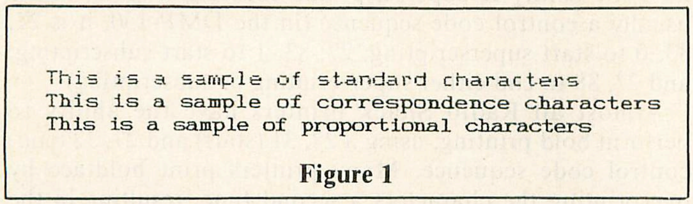
The printer we'll use for examples will be the Tandy DMP-130. This is an efficient, inexpensive dot matrix printer that I'm sure many of you have. If you don't have a DMP-130, you're still in luck, because most of the control code sequences used for illustration here will be the same for your printer — there's a great deal of similarity between the capabilities of the printers and their use of the Tandy control codes.

Fonts

Current Tandy printers have three basic fonts, which are

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects or computers ranging from mainframes to micros.

the designs of the printable characters: standard, correspondence and proportionally spaced. Figure 1 shows these three basic fonts as printed with a DMP-130.



```
This is a sample of standard characters
This is a sample of correspondence characters
This is a sample of proportional characters
```

Figure 1

As you can see, the quality of the fonts differs — the lowest quality is the standard font, better is the correspondence font, and the highest quality font is the proportional font. The correspondence and proportional fonts approach what would be printed on a daisy wheel printer, as a matter of fact.

On most Tandy printers, the higher-quality fonts take longer to print. For informal printing, then, it makes sense to use the standard font. For letter writing, the correspondence font is nice. For the best quality, say, manuscripts for THE RAINBOW, the proportional font is good.

There is one problem with using the proportional font, however: It is sometimes difficult to get a clean right margin. The term *proportional* simply means that each letter is allocated a different width. Notice in Figure 1 that the first two fonts are spaced at 10 characters per inch (the "of" ends at the same place), while the proportional font compresses the text more. This text compression occurs because letters such as 'i' are less than $^1/_{10}$th-inch wide. The overall appearance of the type is very pleasing, however.

How do you get a justified right margin? Some word processing programs will provide a justified text mode that supports your printer. Often, however, you're left to write a program that counts the widths of individual characters and then inserts thin slivers of space in between words and characters to provide a clean right edge. More on that later.

The Basic Font Control Code Sequence

The corresponding listing to produce the printout in Figure 1 is shown here:

```
100 PRINT#-2, CHR$(27);CHR$(19);
110 PRINT#-2, "This is a sample of standard
    characters"
120 PRINT#-2, CHR$(27);CHR$(18);
130 PRINT#-2, "This is a sample of correspond-
    ence characters"
140 PRINT#-2, CHR$(27);CHR$(17);
150 PRINT#-2, "This is a sample of proportional
    characters"
```

The `PRINT#-2` portion is the standard way in Extended Color BASIC to address the system printer. A normal text line is printed by enclosing the text in quotes. The `CHR$` sequences need some explanation. Each `CHR$` function creates one character; two `CHR$` functions create two characters. The character function *could* be used to print any text character:

```
100 PRINT#-2, CHR$(65);CHR$(66)
```

This line prints AB, for example. In most cases, though, `CHR$` is used to print only those characters that are less than 32 decimal, which are called "control codes" and are usually not entered from the keyboard. The control code decimal 27 is called an "escape" control code and was used on old teletypewriting equipment to signal an interrupt. An escape code often precedes a special control code action, and control code sequences are also called "escape sequences." In this case, the escape sequences are the following:

27, 19 Set standard characters
27, 18 Set correspondence characters
27, 17 Set proportional characters

Once the font is set, it remains in force until a new control code sequence sets another font. You could set a new font at any time, however, just by inserting the control code characters at the proper point in the `PRINT#-2` statement.

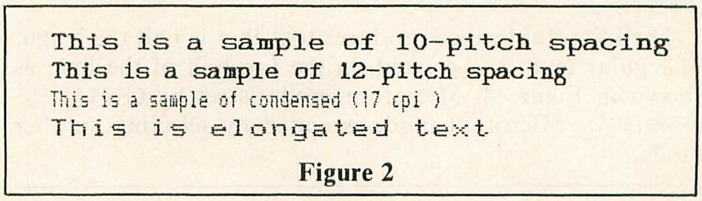
```
100 PRINT#-2, "Standard here, but "; CHR$(27);
    CHR$(18); "correspondence here"
```

Another way to do this is with *concatenated* strings:

```
100 PRINT#-2, "Standard here, but " + CHR$(27) +
    CHR$(18) + "correspondence here"
```

Spacing

For historical reasons, standard spacing is 10 characters per inch horizontally for non-proportional fonts. This makes each character $^1/_{10}$th-inch wide, the same width as typewriter characters (remember typewriters?). Radio Shack printers, however, allow several variations on this standard width, as shown in Figure 2.



```
This is a sample of 10-pitch spacing
This is a sample of 12-pitch spacing
This is a sample of condensed (17 cpi )
This is elongated text
```

Figure 2

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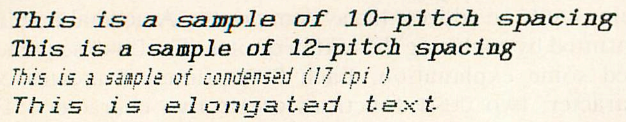
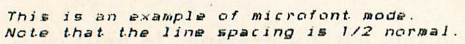


```
This is a sample of 10-pitch spacing
This is a sample of 12-pitch spacing
This is a sample of condensed (17 cpi )
This is elongated text
```

Figure 3



```
This is an example of microfont mode.
Note that the line spacing is 1/2 normal.
```

Figure 4

The top line prints at 10 characters per inch, the standard spacing. The next line is set by the control code sequence `PRINT#-2, CHR$(27); CHR$(29)` and prints at 12 characters per inch. The next line is "condensed," a Radio Shack term for 17 characters per inch. This spacing is about the smallest possible for characters on most printers. It allows 136 columns to be put in eight inches horizontally, a boon for printing spreadsheets and other listings. Essentially, it reduces the large computer listing format down to a manageable 8½-by-11 inch paper size. The condensed text is set by `PRINT#-2, CHR$(27); CHR$(20)`. The final text is "elongated." In this mode, two horizontal dots are printed for every single dot, making the characters twice as wide as they would normally be. Elongated characters can be printed in 10-pitch, 12-pitch and 17-pitch mode. Elongation is set by `PRINT#-2, CHR$(27); CHR$(14)` and reset by `PRINT#-2, CHR$(27);CHR$(15)`.

The bottom line, therefore, is that you can have 10, 12, 17, 5, 6 or 8.5 characters per inch, depending upon the font and spacing set.

Italics and Microfont

Earlier Radio Shack printers do not have an italics or microfont capability. For example, my DMP-2100, a 5-year-old printer, has many options, but not as many as the DMP-130. The DMP-130 and several others have the ability to italicize text for most type styles, as shown in Figure 3. The italics mode is set by `PRINT#-2, CHR$(27); CHR$(66); CHR$(1)` and reset by `PRINT#-2, CHR$(27); CHR$(66); CHR$(0)`.

The microfont mode produces text that is half the height of regular text; it is printed on the top half of the line, as shown in Figure 4. Microfont mode is set by `CHR$(27); CHR$(77)`. Microfont mode is ended by selecting another mode.

Other Character-Related Actions

In addition to italics and microfont, most newer printers have the ability to superscript and subscript. Again, this is usually a control code sequence (in the DMP-130, it is 27, 83, 0 to start superscripting; 27, 83, 1 to start subscripting; and 27, 88 to end either superscripting or subscripting).

Almost all Radio Shack printers have the ability to perform bold printing, using a 27, 31 (start) and 27, 32 (end) control code sequence. Many printers print boldface by overprinting the characters a second time, resulting in the print speed being halved.

Underlining is also a feature found on all printers except for the most ancient. This mode is set by the control code 15 and canceled by the control code 14.

In addition to standard ASCII characters, most newer printers have an *extended character set*. In IBM/Epson mode, this extended character set more or less matches what you see in the extended graphics mode on the screen — foreign characters, shading characters and line segments. In Tandy mode, the same types of characters are present, but the codes are different.

On a typical modern dot matrix printer, therefore, you have about five different type fonts, six types of character spacing, superscripting and subscripting, bold printing, and underlining. All of this for about $250 or less!

Line Spacing

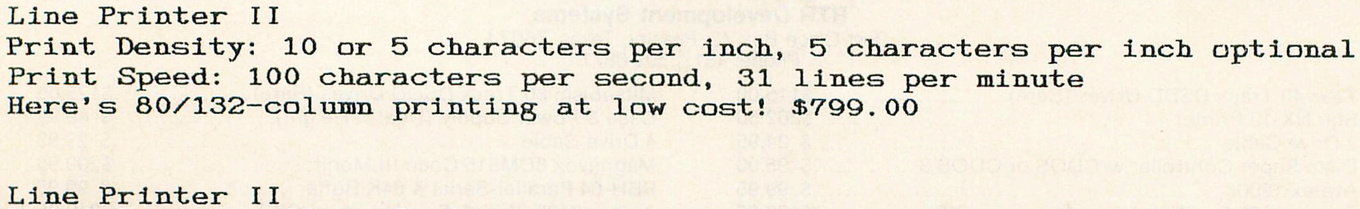
Printers historically have printed at six lines per inch, about the vertical spacing of typewriters. However, all newer printers have the ability to print at six lines per inch, eight lines per inch, and incremental amounts in between. This is a useful feature that allows you to create a variety of line spacing, or "leading," as it is called in the typesetting trade.

The DMP-130, for example, has control code sequences that allow you to space vertically in increments of $^1/_{12}$-inch reverse, $^1/_6$-inch reverse, $^1/_{216}$-inch forward, $^1/_{144}$-inch forward, $^1/_{72}$-inch forward, $^1/_{12}$-inch forward, ⅛-inch forward and $^1/_6$-inch forward, allowing you to get practically anywhere on the page vertically, with a precision of 0.0046 inch! Figure 5 shows the effect of different spacings on text.

Line spacings of six, eight, and 12 lines per inch are used in the figure. Reverse line spacing also could have been used, or a new line of a smaller increment could have been used, but that doesn't make too much sense for text.

Forms Control

The standard "page" for printing is 8½-by-11 inches. The



```
Line Printer II
Print Density: 10 or 5 characters per inch, 5 characters per inch optional
Print Speed: 100 characters per second, 31 lines per minute
Here's 80/132-column printing at low cost! $799.00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Print Speed: 100 characters per second, 31 lines per minute
Here's 80/132-column printing at low cost! $799.00
```

Figure 5

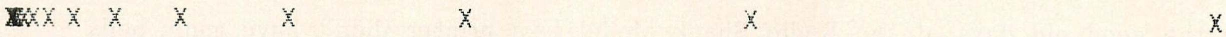

Figure 6

11-inch length translates to 66 lines per page when a standard line spacing of six lines per inch is used. However, newer Radio Shack printers allow you to specify any page length from $^1/_6$ inch (a rather short page) to about 44 inches by using the control code sequence 27, 52, *n*, where *n* is the length in $^1/_6$-inch units. Although most word processing packages also allow you to keep track of the page length and automatically do a new page by a series of line feeds, the built-in page length is something you get for free and can be useful in programs in which the special "form feed" control character (decimal) 12 is used.

Column Positioning

Depending on the font and pitch selected, the firmware of the printer keeps track of the current "dot column" as it is printing. The DMP-130, for example, prints a 9-by-9 matrix of dots in the standard font in 10 pitch with each character occupying 12-dot columns (there's some blank space between characters). Since 80 characters can be printed per page, the total number of dot columns in this mode is 80 times 12, or 960 dot columns. In 12 pitch, the number of dot columns is increased by $^{12}/_{10}$ and becomes 1.2 * 960 = 1,152. For condensed and correspondence modes, the number of dot columns is increased still further.

On most newer Radio Shack printers, the print head can be positioned to any dot column or at least every other dot column by two methods: moving the print head incrementally by a small number of dot positions or moving the print head to a specific dot column on the current print line.

You could, for example, move the print head to dot column 400 out of 0 through 479 on the DMP-130 by using the control code sequence `PRINT#-2, CHR$(27); CHR$(16); CHR$(1); CHR$(144);`.

The first two characters here specify that this is a print head positioning action. The 1 and 144 are the two bytes that define the dot column. The first byte must be multiplied by 256 — the final dot column is defined by 1 * 256 + 144 = 400.

To see how this works, consider the following code, which prints an 'X' at dot columns 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233 and 377 (this is a *Fibonacci series*, in which the next position is determined by adding the previous two numbers — 8 and 13 produce 21, for example):

```
100 N1 = 1
110 N2 = 0
120 N3 = N1 + N2
130 PRINT#-2, CHR$(27); CHR$(16); CHR$(INT
    (N3/256)); CHR$(N3 - INT(N3/256) * 256);
    "X";
140 N1 = N2
150 N2 = N3
160 IF N2 <> 377 THEN GOTO 120
170 PRINT#-2
```

The printing for this code is shown in Figure 6.

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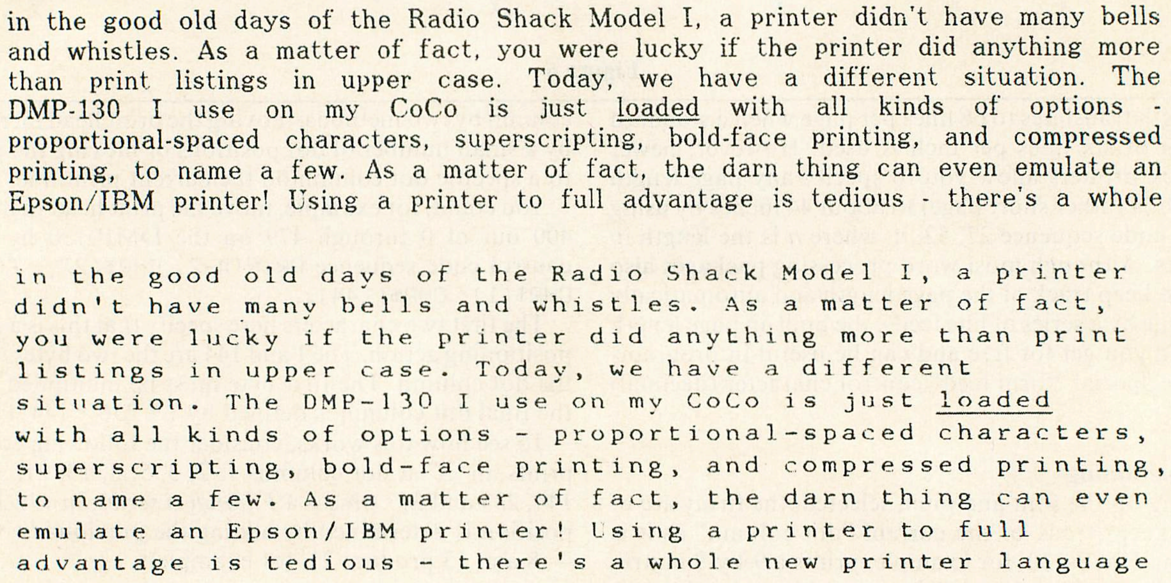

in the good old days of the Radio Shack Model I, a printer didn't have many bells
and whistles. As a matter of fact, you were lucky if the printer did anything more
than print listings in upper case. Today, we have a different situation. The
DMP-130 I use on my CoCo is just loaded with all kinds of options -
proportional-spaced characters, superscripting, bold-face printing, and compressed
printing, to name a few. As a matter of fact, the darn thing can even emulate an
Epson/IBM printer! Using a printer to full advantage is tedious - there's a whole

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to name a few. As a matter of fact, the darn thing can even
emulate an Epson/IBM printer! Using a printer to full
advantage is tedious - there's a whole new printer language

Figure 7

Although the DMP-130 does not have incremental dot positioning, other printers have a "proportional spacing" control sequence, in which you can move the print head tiny amounts, usually 0 to 9 dot columns (`CHR$(27); CHR$(n)`, where *n* is 0 to 9). This allows you to move relative to the current print head position. This sequence is handy for doing justification of text in proportional spacing mode. The proportional font prints characters in varying widths. To get a clean right edge (a *justified* edge), these steps must be followed:

- Find the word break
- Put everything after the word break on the next line
- Look up the widths of every character on the current text line and arrive at a grand total
- Find the difference between this grand total and the dot column width of the line
- Insert slivers of space using the proportional spacing control codes between random words to make up the difference

A sample of justification is shown in Figure 7, on a printout from a DMP-2100. The same justification is possible on printers such as the DMP-130, but the computations must be in absolute dot column values from the left margin. The DMP-130 also has a control code sequence of `CHR$(8) ; CHR$(n)`, where *n* is a number from 0 to 255, and backspaces from 0 to 255 dot columns.

You might ask yourself why all software packages don't provide automatic justification on printing. The answer lies in those five printers per year and the huge number of other printers available. There are so many printers in use and so little standardization that it's hard to provide printer "drivers" (software subroutines) for every printer on a system, even the average CoCo system. As a result, many of the capabilities of the printers in use are not implemented. It's a shame, too, because the quality of the printing could be much better.

Graphics Modes

As printers became controlled by microprocessors and print actions by firmware or by software inside the printers, it became easy to add graphics printing. After all, what's the difference in printing a dot matrix representing an alphabetic character and printing those same dots to represent graphics? High resolution graphics printing actually preceded high resolution screens in microcomputers, and current printers can more than match the CoCo 3's 640-by-192 Hi-Res screen.

In graphics printing, the same action is taken to print either seven dots (Tandy) or eight dots (IBM/Epson) per vertical column. Newer printers also print with nine-pin heads and 24-pin heads, but in Tandy mode, most graphics printing is done in seven-dot columns.

In normal text printing, "white space" is inserted between columns, as shown in Figure 8. However, in graphics mode, no white space is required, because the graphics dots must be contiguous — the next dot column must start one dot away vertically from the last dot column. Because of this, a smaller line spacing is used in graphics mode, $^7/_{72}$-inch in the DMP-130 or similar spacing in other printers.

The number of dot columns per inch horizontally is usually

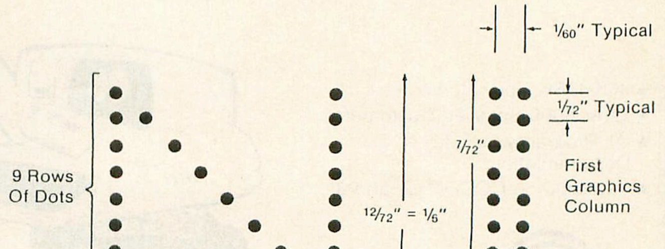

Figure 8: Graphics Spacing

on the order of 60, although some Radio Shack printers allow even greater resolution — up to hundreds of dots per inch. The DMP-130, for example, prints graphics dot columns at 60 per inch, making the total number of dot columns across the page 480. In a 10-inch vertical print area, there are 104 dot columns or 728 dots. This makes the total "resolution" of a printed page about 480 by 728 dots, a total of 349,000.

The aspect ratio of 480 to 728, however, doesn't really match the CoCo 3 screen aspect ratio of 4 to 3. Therefore, it's difficult to "print the screen" in screen dumps in graphics mode unless some compensation is made. One way to do a screen dump is to rotate the dump 90 degrees to print the horizontal portion of the screen vertically on the paper. The aspect ratio now becomes $^{192}/_{60}$ = 3.2 to 640 / 72 = 8.8 inches, or 8.8 to 3.2. Expanding the vertical screen dimension (printed horizontally) by printing two dots for every screen dot makes the aspect ratio 8.8 to 6.4 inches very close to the screen's 4:3 aspect ratio. CoCo screen dumps have been described in this column in the past and are easy to do.

What is more difficult to accomplish is doing anything significant with printer graphics without a great deal of trouble. CoCo Extended Color BASIC and OS-9 BASIC09 have quite good graphics commands that allow you to draw and color lines, boxes, circles, windows and complex shapes. Printer "language," however, has no such capability — the best you can do is draw a vertical column of dots. This means that unless screen dumps are done, graphics on printers must be done by laboriously translating figures into a series of vertical dot columns. This is a tedious operation, to say the least. Here's a sample:

Suppose we have the shapes and initials shown in Figure 9 and want to print them on our system printer as a logo. First, an overlay representing the printer resolution must be

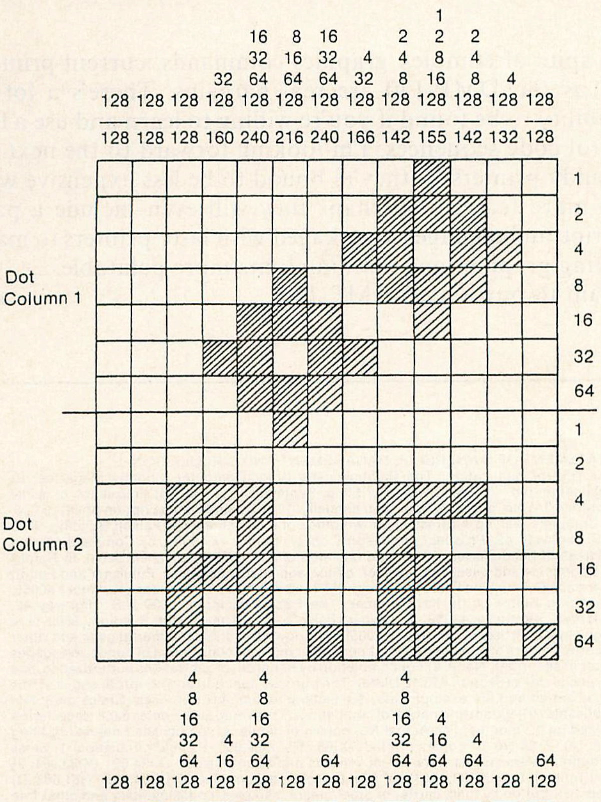

Figure 9: Typical Graphics Translation

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superimposed on the shape. Next, the lines across the shape must be converted into dot columns. Each dot column is then encoded into a numeric value. In Tandy graphics mode, the seven dots in a dot column represent values of 1, 2, 4, 8, 16, 32, 64, and 128, moving from top to bottom. The final value for each dot column is calculated by adding the individual dot values together and then adding 128. (The 128 value sets the most significant bit of the byte, marking it as a graphics value when sent to the printer.)

To print the graphics shape, graphics mode is set by a `PRINT#-2, CHR$(18)`. Each line of dot columns is then printed by sending the individual dot column values. At the end of each line, a `PRINT#-2` moves to the next line, spacing the $^{7}/_{72}$-inch graphics line spacing. The complete program is shown below.

```
100 DATA 128, 128, 128, 160, 240, 216, 240, 166
110 DATA 142, 155, 142, 132, 128
120 DATA 128, 128, 252, 148, 252, 128, 192, 128
130 DATA 252, 212, 196, 128, 192
140 PRINT#-2, CHR$(18)          ' set graphics mode
150 FOR I = 1 TO 13              ' print first row
160 READ A
170 PRINT#-2, CHR$(A);
180 NEXT I
190 PRINT#-2                     ' line feed
200 FOR I = 1 TO 13              ' print second row
210 READ A
220 PRINT#-2, CHR$(A);
230 NEXT I
240 PRINT#-2                     ' line feed
```

In spite of complex graphics commands, current printers such as the DMP-130 are real bargains. There's a lot of capability to be found if you're willing to learn and use a few control code sequences. I'm looking forward to the next set of Tandy printers — they're bound to be less expensive with even more features. Perhaps they will even include a page description language as packaged with laser printers to make drawing graphics and defining fonts more palatable.

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KISSable OS-9

Putting Data Structures on the Drawing Board

By Dale L. Puckett
Rainbow Contributing Editor

KISSDraw takes a great leap forward this month as we show you how to save your artwork and load it back into memory. We also increase the speed of the program dramatically by taking a different approach to output and finish the `KISSDrawArc` routine. We tinkered with the design of the `HandleMenu` procedure, and the file menu now works like the menus on a Macintosh. *KISSDraw*'s overall structure remains basically the same, so you won't be starting over from scratch.

From Easy to Easy

The first goal we wanted to accomplish when we started *KISSDraw* was to show you how easy it is to do really amazing graphics programming with the primitives built into OS-9 — especially when you access them through BASIC09. Our next objective was to introduce the general concept of event- and object-oriented programming. Last month, we introduced the main event loop. This month we hope to concentrate on objects.

Down the road we hope to experiment with OS-9's `SS.MsSig GetStat` call to see if we can come up with a way for the `GetKISSMouse` routine to run in the background continuously, sending a signal to *KISSDraw* — or any other program you install it in — each time there is a mouse event. If we do that, the main program will be able to go about its business until it is summoned by the mouse. But that's another column.

We hadn't even finished last month's column when we ran into a brick wall. We were in a hurry and wanted to publish a routine that would let you save your drawings in a disk file. From the beginning, we had planned to redirect the output of *KISSDraw*'s `DoEvent` procedure to a `tee` filter. The output of the `tee` would go to a disk file and the screen at the same time. It was a great idea! But, you can't redirect the run statements in a BASIC09 program.

On several occasions I wrote BASIC09 programs as filters and ran them using `RunB` from the OS-9 command line, so I thought I could attack the problem by using BASIC09's Shell statement to run an OS-9 command that was actually a module of BASIC09 I-code. It wasn't meant to happen. It would take an act of Congress and quite a programming feat to put together the string required to pass the complex data structure *KISSDraw* uses to `RunB`. Once again we had proven the old programmers adage: prior planning could have prevented poor performance.

Managing Your Development

As your programs grow larger, you'll quickly discover that you need to get organized. During the past month we reached that point with *KISSDraw*. The length of the source code has now reached the point where *KISSDraw* will no longer fit when BASIC09 is running with 32K of workspace. However, because of BASIC09's modular design and its ability to pack procedures into intermediate code modules, we can continue our project.

The solution is to pick the modules you feel are stable at this point in your program's development cycle and pack them into BASIC09 I-code modules that can reside anywhere in the 512K bytes available in your Color Computer 3 — but outside your BASIC09 workspace.

When you do this, you'll free plenty of memory. For example, `KISSdMenu` presently needs 3,885 bytes in BASIC09's workspace. When it's packed, it only needs 761 bytes of memory. The source for `WhichTool` is 1,914 bytes long. Its packed binary code is only 864 bytes long. And `KISSDrawArc` took 3,192 bytes of source code. It packs down to 1,585 bytes.

Next month, we will merge packed modules of `SetUpMouse`, `WhichTool`, `DoEvent`, `KISSdmenu`, `KISSfreehand` and the individual procedures that draw bars, boxes, circles, ellipses and lines. They all fit in a file less than 8K long. It's important to notice we planned it that way. Why?

A Typical Problem

Let's study a typical troubling scenario that many people are running into these days, if the questions on RAINBOW's Delphi OS-9 On-Line Forum are an indicator. The symptoms are "Error 32 — Memory Full" and "Error 43 — Unknown Procedure" messages. The

---

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Complete Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.*

reason they are receiving these messages is complex, but it's easy to understand when you analyze the problem.

> ***"Even though you have 512K bytes of memory available on your Color Computer 3, each process you run can use only 64K of memory for its program code and its data."***

Even though you have 512K bytes of memory available on your Color Computer 3, each process you run can use only 64K of memory for its program code and its data. When BASIC09 is running, it is a process. Its program code uses 23,244 bytes. However, because of the way OS-9 Level II memory management works, it takes a full three blocks or 24,576 bytes. If you run BASIC09 with 32K bytes of data memory, you have used a total of 56,012 bytes or seven blocks of memory. Of the 65,536 bytes or eight blocks available, you have 8,192 bytes or one block left in BASIC09's 64K process block.

Let's assume you are a beginning BASIC09 programmer and have not yet mastered OS-9. In that case you probably haven't gotten around to merging the `InKey` and `SysCall` modules into your `gfx2` file. Planning to write a large program, you ask for 32K of memory when you start BASIC09. You decide to start with a simple routine, but that routine just happens to use `InKey` and `gfx2`. You look at the listing time and time again. It has to be right. In fact, it is right. But after listing your procedure again, you type `RUN` for the 16th time and get the same error messages again. What happened?

When your BASIC09 procedure encountered the line `RUN InKey(Char)`, it did not find a procedure by that name in your BASIC09 workspace since `InKey` is an I-code module. OS-9 then looked in its module directory to see if a module named `InKey` existed. It didn't, so it looked for a file by that name in your current execution directory, loaded it and then linked to the module `InKey`. When OS-9 loaded the 94-byte `InKey` module it stored it in an 8K block. When your BASIC09 program ran `InKey`, OS-9 switched the entire 8K block of memory into your 64K BASIC09 workspace.

You're OK so far. You have used exactly 65,536 bytes or eight blocks of memory — all that is allotted to a process. But the next line of your program uses the `gfx2` procedure to clear your Color Computer's screen. BASIC09 retraces its steps and attempts to switch the 8K block of memory that contains the 2,250-byte `gfx2` module. It quickly discovers that there's not another 8K block of memory left in BASIC09's process area, and you receive the error message.

The answer is to merge `gfx2`, `SysCall` and `InKey` into one file. Since `gfx2` is only 2,250 bytes long, you have plenty of space left in its 8K block. In fact, we'll probably merge several of *KISSDraw*'s general modules into this file once they are finalized. Since almost any BASIC09 graphics program we write uses `gfx2`, we will have access to quite a few of the *KISSDraw* primitives at no extra memory cost.

This all means if you are going to run a file containing up to 8K of packed I-code modules from within your BASIC09 programs, you must not ask for more than 24K of memory. An 8K block for any module in your own file, plus an 8K block for `gfx2` and any modules contained in its file and the 24K BASIC09 workspace add up to 40K. That leaves 24K for BASIC09's program code and that's exactly what it uses.

If your file of packed modules contains between 8,193 and 16,383 bytes, you will use 16K of memory when you

```
TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:
 INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE
 ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:
 INTEGER
TYPE stats=IsEvent,InWindow,InToolBox,InMenuBar,line,box,circle
 ,ellipse,bar,arc,fill,text,freehand,RecordOn:BOOLEAN
TYPE cursor=OutPut,Scale,ScreenType,NoCur,arrow,pencil,cross
 ,hourglass,NoIcon,TextBar,Scross,Icon,IconBuff,pattern
 ,horzline,vertline,slantright,slantleft,dots:BYTE
TYPE codes=DArc,DBar,DBox,DCircle,DEllipse,DLine,DPoint,DFill
 ,DSetPtr,DPutCur,DSetCur,DLogic,DPattern:INTEGER
TYPE object=DCode,HorP,VerP:INTEGER
TYPE orgin=DPSCode,HanX,HanY:INTEGER
TYPE packet=mouse:rodent; status:stats; pointer:cursor; Code
 :codes; Pen:object; Handle:orgin
```

Figure 1: Type Statements

Listing 1: `KISSDrawPut`

```
PROCEDURE KISSDrawPut
 0000      (* Drawing program For the Color Computer III
```

Insert type statements from Figure 1

```
 01CE      TYPE Drawing=Loc:orgin; tool:object
 01E3
 01E4      DIM Event:packet
```

load it. You will then only be able to ask for 16K of BASIC09 workspace. Let's add it up again:

16K+8K+16K+24K=64K.

Ponder what would have happened if we had stored the *KISSDraw* modules listed above in individual files in our CMDS directory. They would have used 88K of memory when they were loaded. That's not a problem. But each time we called a new one from our BASIC09 program we would have switched another 8K block of memory into our 64K workspace. After the first two or three, we would be out of memory within BASIC09's workspace.

> ***"We revamped the HandleMenu procedure, attempting to emulate the way a Macintosh menu works. The patient lived."***

To merge `gfx2`, `InKey` and `SysCall`, you can run the following lines from the OS-9 prompt.

```
chd /dd/cmds
rename gfx2 gfx2.original
merge gfx2.original InKey
     SysCall > gfx2
attr gfx2 e pe
```

If you are going to be running a lot of packed BASIC09 programs from the OS-9 command line rather than from within BASIC09 itself, you may also want to merge `InKey` and `SysCall` into your `RunB` file. This will cover you when you run a packed program from the OS-9 command line that does not use the `gfx2` module but does use `InKey` and `SysCall`. Just change `gfx2` to `RunB` in the command lines above.

The bottom line: Remember that the OS-9 memory management scheme switches 8K of memory at a time into the workspace used by a process, no matter how short the module in that 8K block, and always account for that 8K of memory.

Type Changes This Month

If you look closely at the `TYPE` statements in our new version of *KISSDraw*, you'll notice several changes. After we

```
01ED      DIM MaxObjects,ObjNum:INTEGER
01F8      DIM PixFile:BYTE
01FF      DIM Picture(20):Drawing
020D      DIM char:STRING[1]
0219
021A      MaxObjects:=20
0221      FOR ObjNum:=1 TO MaxObjects
0232        Picture(ObjNum).Loc.DPSCode:=0
0243        Picture(ObjNum).Loc.HanX:=0
0254        Picture(ObjNum).Loc.HanY:=0
0265        Picture(ObjNum).tool.DCode:=0
0276        Picture(ObjNum).tool.HorP:=0
0287        Picture(ObjNum).tool.VerP:=0
0298      NEXT ObjNum
02A3      ObjNum:=1
02AA
02AB      char:=""
02B2      Event.status.RecordOn:=FALSE
02BF      Event.Code.DSetCur:=$1B39
02CE      Event.Code.DPutCur:=$1B4E
02DD      Event.Code.DSetPtr:=$1B40
02EC      Event.Handle.DPSCode:=Event.Code.DSetPtr
0301      Event.Code.DBox:=$1B48
0310      Event.Code.DBar:=$1B4A
031F      Event.Code.DCircle:=$1B50
032E      Event.Code.DEllipse:=$1B51
033D      Event.Code.DFill:=$1B4F
034C      Event.Code.DLine:=$1B44
035B      Event.Code.DArc:=$1B52
036A      Event.pointer.OutPut:=1
0378      Event.status.IsEvent:=FALSE
0385      Event.status.line:=FALSE
0392      Event.status.box:=FALSE
039F      Event.status.circle:=FALSE
03AC      Event.status.ellipse:=FALSE
03B9      Event.status.bar:=FALSE
03C6      Event.status.arc:=FALSE
03D3      Event.status.fill:=FALSE
03E0      Event.status.text:=FALSE
03ED      Event.status.freehand:=FALSE
03FA
03FB      Event.pointer.NoCur=0
0409      Event.pointer.arrow=1
0417      Event.pointer.pencil=2
0425      Event.pointer.cross=3
0433      Event.pointer.hourglass=4
0441      Event.pointer.NoIcon=5
044F      Event.pointer.TextBar=6
045D      Event.pointer.Scross=7
046B      Event.pointer.IconBuff=202
0479
047A      (* First we need to start with a clear screen
04A7      (* and draw the menu
04BB
04BC      RUN gfx2("clear")
04C9      RUN KISSdMenu(Event)
04D3
04D4      (* We must bring the high resolution mouse on line
0506      (* and find out where it is pointing
052A
052B      RUN setupmouse
052F      Event.Pen.DCode:=Event.Code.DSetCur
0544      Event.Pen.HorP:=INT(256*Event.pointer.IconBuff)+Event.pointer.arrow
056A      Event.Pen.VerP:=0
0578      PUT #1,Event.Pen
0585
0586      LOOP  \REM Main Event Loop
059A
059B      EXITIF char<>"" THEN
05A7      ENDEXIT
05AB
05AC        RUN inkey(char)
05B6        RUN getKISSmouse(Event)
05C0
05C1        (* Has there been an event
05DC        (* Is Button Down
05ED
05EE        IF Event.status.IsEvent THEN
05FD          IF Event.status.InToolBox THEN
060C            RUN WhichTool(Event)
0616            Event.Pen.DCode:=Event.Code.DSetCur
```

```
062B            Event.Pen.HorP:=256*Event.pointer.IconBuff+Event.pointer.pencil
064E            Event.Pen.VerP:=0
065C            PUT #1,Event.Pen
0669            RUN DoEvent(Event)
0673            REM Record Data Structure Picture here is Record Flag is ON.
06AE            IF Event.status.RecordOn THEN
06BD              IF ObjNum<=MaxObjects THEN
06CA                Picture(ObjNum).Loc:=Event.Handle
06DC                Picture(ObjNum).tool:=Event.Pen
06EE                ObjNum:=ObjNum+1
06F9              ENDIF
06FB            ENDIF
06FD
06FE            Event.Pen.DCode:=Event.Code.DSetCur
0713            Event.Pen.HorP:=256*Event.pointer.IconBuff+Event.pointer.arrow
0736            Event.Pen.VerP:=0
0744            PUT #1,Event.Pen
0751          ENDIF
0753
0754          IF Event.status.InMenuBar THEN
0763            RUN HandleMenu(Event,Picture)
0772          ENDIF
0774        ENDIF
0776      ENDLOOP
077A
077B      (* Turn Graphics Cursor off before leaving program
07AD      Event.Pen.DCode:=Event.Code.DSetCur
07C2      Event.Pen.HorP:=Event.pointer.NoCur
07D7      Event.Pen.VerP:=Event.pointer.NoCur
07EC      PUT #1,Event.Pen
07F9      END
07FB
```

Listing 2: `GetKISSMouse`

```
PROCEDURE GetKISSMouse
 0000     (* Reads the present location of the mouse and
 002E     (* returns the status of the button.
```

Insert type statements from Figure 1

```
 01F3     PARAM Event:packet
 01FC
 01FD     TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 0222
 0223     DIM RegisterSet:registers
 022C     DIM callcode:BYTE
 0233
 0234     RegisterSet.a:=0
 023F     RegisterSet.b:=$89
 024B     RegisterSet.x:=ADDR(Event.mouse)
 025C     RegisterSet.y:=1
 0267     callcode:=$8D
 026F
 0270     RUN syscall(callcode,RegisterSet)
 027F
 0280     IF Event.mouse.CBSA<>0 THEN
 0292       Event.status.IsEvent:=TRUE
 029F     ELSE
 02A3       Event.status.IsEvent:=FALSE
 02B0     ENDIF
```

made them in the main procedure, we copied them into all of the other procedures using *DynaStar*, the screen editor from FHL. This saved us several hours of typing with the BASIC09 editor.

We'll point out some of the major features here. The data type `rodent`, which holds a packet of information from the mouse, wasn't changed. In the data type `stats`, we changed the name of the `Event` to `IsEvent`. This lets us change the name of our packet from `ButtonEvent` to `Event`, saving many keystrokes and making more sense. We also added a field named `RecordOn` here and removed all of the fields that define fill patterns.

The data type `cursor` grew. We added a field that can be used to hold an `OutPut` path if we need it later. We also added a field named `Scale` and another named `ScreenType`. We'll need this when we get around to adding a `GetStat` call to determine the screen type. An 80-column screen type will be assigned a scale of one while a 40-column screen will have a scale value of two. After we add these routines, we will edit the `GetKISSMouse` procedure so the horizontal pixel position is always the position returned by the mouse divided by the scale. This means if we run *KISSDraw* in a 40-column window, it will handle it automatically. Presently, you must only run it in an 80-column window.

We moved the pattern fields into the data type cursor, which is made up of `BYTE` fields. This lets us store the numerical value for each type of pattern in a variable named `pointer`. Instead of typing a group number — which doesn't mean much to human beings — to set a pattern, we can now type a field name. It takes a few more keystrokes, but it makes your code almost intuitively obvious to anyone who reads it.

Additional data types added this

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month include `object`, `orgin` (which we discussed earlier) and `codes`. Data of the `TYPE` codes is used to store the actual numerical codes that define the various objects we want to draw. We can then use symbolic names when we define our objects instead of hexadecimal numbers that don't mean anything to anyone.

An example would help here. First, we'll go ahead and show you the `DIM` statement for the new data packet and then we'll initialize one of the tools:

```
TYPE packet=mouse:rodent;
            status:stats;
            pointer:cursor;
            code:codes; Pen:
            object; Handle:
            orgin
DIM Event:packet
Event.Pen.DCode:=Event.Code.
                 .DBar
```

In addition to the data types there are a few other things worth spotlighting in this month's listing. Immediately after the `DIM` statements, you'll find a `FOR-NEXT` loop that initializes the entire array picture to a value of 0 and sets the `ObjNum` to 1.

In the next section we initialize many of the variables used by *KISSDraw.* It's here that we set the value in each of the drawing code fields. The next major change to *KISSDraw*'s main procedure occurs in the main event loop. After we run the procedure `DoEvent` (next month) to put an object on the screen, we check to see if the flag, `Event.Status.RecordOn`, is true. If it is, we check to make sure the array `Picture` is not full. If there is still room in `Picture`, we store the object that we just put on the screen in `DoEvent` in the array. Notice that `Event.Handle` and `Event.Pen` together put one drawing in the array. After we put them there, we increment the counter `ObjNum`.

In the `SavePix` routine we did not worry about the handling of filenames. We simply opened a file named `TestSave` for `Update`. To make sure it was there, we created a dummy file with that name that contained one character. Eventually, we will have to deal with files that already exist and add a routine that prompts you for a filename in an overlay window.

We added the `PreviewPix` procedure to the menu items to give you a way to look at the images you have stored in a picture before you send them to a file. We used an overlay window and reversed the screen colors in this routine,

```
02B2
02B3        IF Event.mouse.AcY<10 THEN
02C5          Event.status.InMenuBar:=TRUE
02D2        ELSE
02D6          Event.status.InMenuBar:=FALSE
02E3        ENDIF
02E5
02E6        IF Event.mouse.AcX<40 THEN
02F8          Event.status.InToolBox:=TRUE
0305        ELSE
0309          Event.status.InToolBox:=FALSE
0316        ENDIF
0318
0319        IF NOT(Event.status.InMenuBar) AND NOT(Event.status.InToolBox
              ) THEN
0334          Event.status.InWindow:=TRUE
0341        ELSE
0345          Event.status.InWindow:=FALSE
0352        ENDIF
0354
0355        REM Put out the Cursor
036A        Event.Pen.DCode:=Event.Code.DPutCur
037F        Event.Pen.HorP:=Event.mouse.AcX \Event.Pen.VerP:=Event.mouse.AcY
03A9        PUT #1,Event.Pen
03B6        END
```

Listing 3: SavePix

```
PROCEDURE SavePix
 0000       (* This procedure will record the data structure containing
 003B       (* your picture.
```

Insert type statements from Figure 1

```
01EB
01EC        TYPE drawing=loc:orgin; tool:object
0201        PARAM Event:packet; Picture(20):drawing
0217
0218        DIM PixFile:BYTE
021F
0220        OPEN #PixFile,"TestSave":UPDATE
0233        PUT #PixFile,Picture
023D        CLOSE #PixFile
0243        END
0245
```

Listing 4: LoadPix

```
PROCEDURE LoadPix
 0000       (* This procedure will put a picture you have recorded earlier
 003E       (* on your Color Computer III screen.  Eventually, it will also
 007D       (* load the picture into your data structure so you can change it.
```

Insert type statements from Figure 1

```
0260        TYPE drawing=loc:orgin; tool:object
0275        PARAM Event:packet; Picture(20):drawing
028B
028C        DIM PixFile:BYTE
0293        DIM NumDrawing:INTEGER
029A
029B        OPEN #PixFile,"TestSave":READ
02AE        GET #PixFile,Picture
02B8        PUT #1,Picture
02C1        CLOSE #PixFile
02C7        END
```

Listing 5: PreviewPix

```
PROCEDURE PreviewPix
 0000       (* This procedure will open an overlay window over KISSDraw and
 003F       (* display the work you have recorded into the data structure
 007D       (* picture.  KISSDraw's screen will be saved underneath it.
```

Insert type statements from Figure 1

```
0259        TYPE Drawing=Loc:orgin; Tool:object
026E        PARAM Event:packet; Picture(20):Drawing
0284        DIM GoBack:STRING[1]
0290
0291        GoBack:=""
```

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just for the fun of it. Another handy addition is the procedure `ErasePix`, which you access from the file menu. It merely erases the screen at this time. It does not null the array `picture` to zero yet. We will probably rewrite it to work that way soon.

We revamped the `HandleMenu` procedure this month because I didn't like the feel of the "user interface" in last month's code. This time we attempted to emulate the way a Macintosh menu works. The patient lived. We also give you the option to set `Event.Status.RecordOn` to true or false from the menu. Using this switch, you can turn the recording on and off at will, saving only the mouse moves you want to the final picture.

After reading the descriptions of the `Arc` routines in the windows section of the OS-9 Level II manual and the BASIC09 manual another dozen times and running scores of experiments, the light bulb finally came on. The secret, for us, was found by emulating the algorithm described in the OS-9 manual `Arc` section manually. We physically drew a line in each quadrant and then drew an arc from that line in a clockwise direction from the ending point of the line to the beginning point. Once we did this, the order we had to use to send the line information to the screen became obvious. It's hard to admit it took several days to figure this one out.

That's `KISSDrawPut` in a nutshell. Study the listings and experiment. Hopefully before too long we'll add a routine that lets you print a hard copy of your picture. We're anxious to add the procedure to determine the `screentype` and set the `scale` field. And we can't wait to add a color menu bar along the top of the screen. And, when we were working on the line command, we figured out how to do polygons. And we have to design that data type to save irregular objects. Now, if someone would just tell us how to handle layering!

Well, that is about all we have room for this month. We'll have to pick up the subject again in January. You should have plenty of work to do with what is here. The remaining listings will appear next month. After you finish entering those, you will have a near-complete version of `KISSDraw`. At that point, we can begin to make some refinements.

Enjoy your holiday season, drive carefully and join us next month for the 1988 edition of RAINBOW's Beginners Issue. Till then, keep on drawing! ☐

```
0298       RUN gfx2("OWSet",1,0,0,80,24,0,2)
02BA       PUT #1,Picture
02C3       WHILE GoBack="" DO
02CF         RUN InKey(GoBack)
02D9       ENDWHILE
02DD       RUN gfx2("OWEnd")
02EA       END
```

Listing 6: `ErasePix`

```
PROCEDURE ErasePix
 0000      (* This procedure gives you a way to erase your
 0030      (* CoCo III screen when your artwork goes down hill and
 0067      (* you want to start again.
```

Insert type statements from Figure 1

```
0221       PARAM Event:packet
022A
022B       RUN gfx2("clear")
0238       RUN KISSdMenu(Event)
0242       END
```

Listing 7: `HandleMenu`

```
PROCEDURE HandleMenu
 0000
```

Insert type statements from Figure 1

```
01A0
01A1       TYPE drawing=loc:orgin; tool:object
01B6       PARAM Event:packet; Picture(20):drawing
01CC
01CD       DIM Menu(6):STRING[14]
01DE       DIM FileAction:STRING[25]
01EA       DIM MenuCur,Item:INTEGER
01F5
01F6       DATA "ErasePix","LoadPix","PreviewPix","SavePix","RecordOn"
            ,"RecordOff"
023D
023E       FOR Item:=1 TO 6
024E         READ Menu(Item)
0257       NEXT Item
0262
0263       RUN gfx2("OWSet",1,10,0,16,8,0,2)
0285       RUN gfx2("boldsw","on")
0298       RUN gfx2("CurXY",0,0)
02AB       PRINT "F I L E    "
02BB       RUN gfx2("boldsw","off")
02CF       FOR Item:=1 TO 6
02DF         PRINT Menu(Item)
02E7       NEXT Item
02F2
02F3       REM while the mouse button is down
0314       REM and in the overlay menu window
0335       REM flash the menu item the mouse is on
035B       WHILE Event.mouse.CBSA<>0 AND Event.mouse.Stat=0 DO
037A         RUN getKISSMouse(Event)
0384         MenuCur:=INT(Event.mouse.AcY/8)
0397         Item:=MenuCur
039F         IF MenuCur>0 AND MenuCur<7 THEN
03B2           RUN gfx2("revon")
03BF           RUN gfx2("CurXY",0,MenuCur)
03D4           PRINT Menu(Item)
03DC           RUN gfx2("RevOff")
03EA           RUN gfx2("CurXY",0,MenuCur)
03FF           PRINT Menu(Item)
0407         ENDIF
0409       ENDWHILE
040D       RUN gfx2("OWEnd")
041A
041B       REM Drop out of loop when mouse button is opened
044A       REM If mouse was on menu item then
046C       REM run the procedure the button was over
0494       IF MenuCur>0 AND MenuCur<7 AND Event.mouse.AcX>80 AND Event.mouse.AcX
            <128 THEN
04C1         FileAction:=TRIM$(Menu(Item))
04CD         IF FileAction="RecordOn" THEN
04E1           Event.status.RecordOn:=TRUE
04EE         ELSE
```

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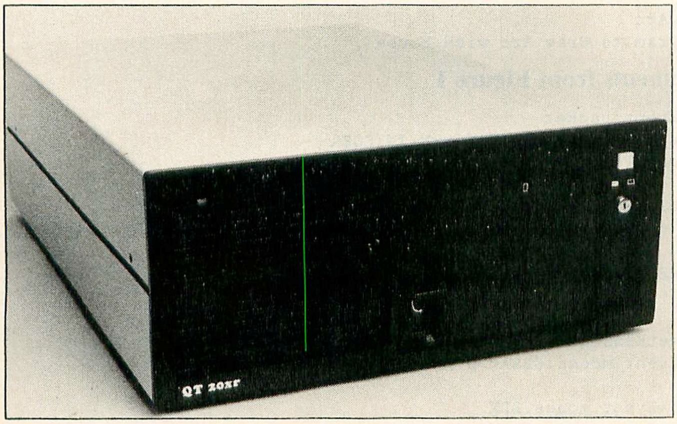

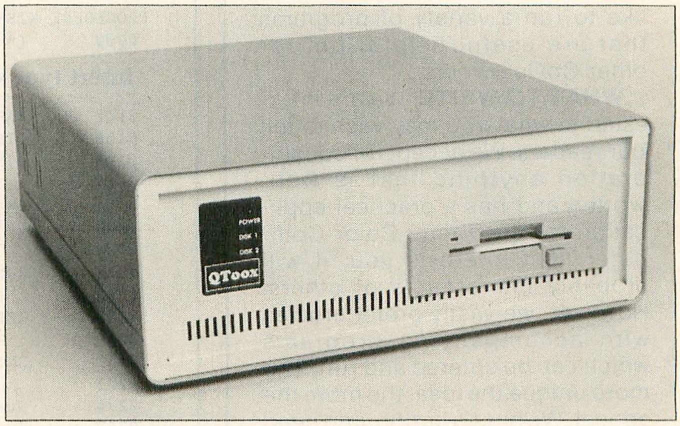

QT 20xr

The ***QT 20xr*** is our new high capacity, high speed series of 68020 based computers. Housed in a rack mountable heavy duty chassis, the ***QT 20xr*** series is built for speed. All systems feature the 16 Mhz MC 68020 with math coprocessor option. DMA on all drives. Expandable to 14 1/2 Megabytes of RAM and more than 30 users. All systems include the OS9 Professional Operating System with the 68020 C compiler, Basic plus backup and communications packages.

System #1 features;

- 85 Meg high speed drive
- 2 1/2 Megabytes of RAM
- 10 Serial ports (users)
- 4 Terminals and all cables.
- **$8,995.00**

System #2 features;

- 280 Meg very high speed drive
- Streaming tape backup
- 14 1/2 Megabytes of RAM
- 30 Serial ports (users)
- 20 Terminals and all cables
- **$28,995.00**

The ***QT 20xr*** computers are custom made to order. Write or call for a quote on other configurations. Terms prepaid, delivery is 4 to 6 weeks average.

QT 00x

The ***QT 00x*** (double oh x) is our new 68000 based replacement for the popular ***QT Plus***. The 00x has 8 serial ports (users) standard instead of 4, a 30 megabyte hard disk instead of a 20. 1024K RAM! A real time battery backed clock and 3 parallel ports. In addition to all this the case will support 4 HH drives and other new boards now available. The only thing that hasn't changed is the price. That's right, all of the above for **only $2995!**

Least we forget, we also include the OS9 Professional Operating System with umacs screen editor, assembler and all the utilities. If that's not enough we also include the C compiler and Basic! If that's not enough we also include floppy disk backup and communications software. Want more? With your purchase you'll also be able to buy additional software at discount prices!

You have your choice of 3.5" or 5.25" drives. Other hard drive sizes are also available.

If you've been waiting for the right reason to move up to OS9/68000 and the MC68000 then this has got to be it. No other system offers so much for so little. Call to order or for more information TODAY!!!

Frank Hogg Laboratory, Inc.
770 James St., Syracuse, NY 13203
Telex 646740 - FAX 315/474-8225
315/474-7856

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing renumeration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

```
04F2          IF FileAction="RecordOff" THEN
0507            Event.status.RecordOn:=FALSE
0514          ELSE
0518            RUN FileAction(Event,Picture)
0527          ENDIF
0529        ENDIF
052B      ENDIF
052D      END
052F
```

Listing 8: `KISSDrawArc`

```
PROCEDURE KISSDrawArc
 0000      (* Program to Draw Arc with Mouse
```

Insert type statements from Figure 1

```
01C2        PARAM Event:packet
01CB        DIM StartX,StartY,CurrX,CurrY:INTEGER
01DE        DIM XPos,YPos:BOOLEAN
01E9
01EA        (* Enable XOR logic, then
0203        (* let cursor follow mouse until button is pushed
0234
0235        RUN gfx2("logic","xor")
0248
0249        REPEAT
024B          RUN getKISSmouse(Event)
0255        UNTIL Event.mouse.CBSA<>0 AND Event.mouse.AcX>40
0273
0274        StartX:=Event.mouse.BDX
0282        StartY:=Event.mouse.BDY
0290        CurrX:=Event.mouse.AcX
029E        CurrY:=Event.mouse.AcY
02AC
02AD        WHILE Event.mouse.CBSA<>0 DO
02BF          RUN getKISSmouse(Event)
02C9
02CA          Event.Pen.DCode:=Event.Code.DSetPtr
02DF          Event.Pen.HorP:=StartX
02EE          Event.Pen.VerP:=StartY+(CurrY-StartY)
0305          PUT #1,Event.Pen
0312
0313          IF CurrX<>Event.mouse.AcX OR CurrY<>Event.mouse.AcY THEN
0334
0335            REM Print over old arc to delete it
0357            Event.Pen.DCode:=ABS(CurrX-StartX) \Event.Pen.HorP:=ABS

                 (CurrY-StartY)
037F
0380            XPos:=CurrX-StartX>0 \YPos:=CurrY-StartY>0
039E            IF YPos AND NOT(XPos) THEN 100
03AF            IF YPos OR NOT(YPos) AND NOT(XPos) THEN
03C2              Event.Pen.VerP:=0
03D0              Event.Handle.DPSCode:=StartY-CurrY
03E3              Event.Handle.HanX:=CurrX-StartX
03F6              Event.Handle.HanY:=0
0404            ELSE
0408 100          Event.Pen.VerP:=CurrX-StartX
041E              Event.Handle.DPSCode:=0
042C              Event.Handle.HanX:=0
043A              Event.Handle.HanY:=StartY-CurrY
044D            ENDIF
044F
0450            PUT #1,Event.Code.DArc
0460            PUT #1,Event.Pen
046D            PUT #1,Event.Handle
047A
047B            REM Now update Current position of mouse and redraw
04AD            CurrX:=Event.mouse.AcX
04BB            CurrY:=Event.mouse.AcY
04C9
04CA            REM Must UpDate Draw Pointer Here
04EA            Event.Pen.DCode:=Event.Code.DSetPtr
04FF            Event.Pen.HorP:=StartX
050E            Event.Pen.VerP:=StartY+(CurrY-StartY)
0525            PUT #1,Event.Pen
0532
0533            Event.Pen.DCode:=ABS(CurrX-StartX) \Event.Pen.HorP:=ABS

                  (CurrY-StartY)
055B
055C            XPos:=CurrX-StartX>0 \YPos:=CurrY-StartY>0
057A            IF YPos AND NOT(XPos) THEN 200
```

```
058B          IF YPos OR NOT(YPos) AND NOT(XPos) THEN
059E            Event.Pen.VerP:=0
05AC            Event.Handle.DPSCode:=StartY-CurrY
05BF            Event.Handle.HanX:=CurrX-StartX
05D2            Event.Handle.HanY:=0
05E0          ELSE
05E4 200        Event.Pen.VerP:=CurrX-StartX
05FA            Event.Handle.DPSCode:=0
0608            Event.Handle.HanX:=0
0616            Event.Handle.HanY:=StartY-CurrY
0629          ENDIF
062B
062C          PUT #1,Event.Code.DArc
063C          PUT #1,Event.Pen
0649          PUT #1,Event.Handle
0656        ENDIF
0658      ENDWHILE
065C
065D      RUN gfx2("logic","off")
0670      Event.Pen.DCode:=ABS(CurrX-StartX) \Event.Pen.HorP:=ABS(CurrY
           -StartY)
0698
0699      XPos:=CurrX-StartX>0 \YPos:=CurrY-StartY>0
06B7      IF YPos AND NOT(XPos) THEN 300
06C8      IF YPos OR NOT(YPos) AND NOT(XPos) THEN
06DB        Event.Pen.VerP:=0
06E9        Event.Handle.DPSCode:=StartY-CurrY
06FC        Event.Handle.HanX:=CurrX-StartX
070F        Event.Handle.HanY:=0
071D      ELSE
0721 300    Event.Pen.VerP:=CurrX-StartX
0737        Event.Handle.DPSCode:=0
0745        Event.Handle.HanX:=0
0753        Event.Handle.HanY:=StartY-CurrY
0766      ENDIF
0768
0769      PUT #1,Event.Code.DArc
0779      PUT #1,Event.Pen
0786      PUT #1,Event.Handle
0793      Event.Handle.DPSCode:=Event.Code.DSetPtr
07A8      END
```

Listing 9: `KISSHandleText`

```
PROCEDURE KISSHandleText
 0000      (* Procedure to type text at position
 0025      (* selected with graphics cursor
```

Insert type statements from Figure 1

```
01E6      PARAM Event:packet
01EF
01F0      DIM CharPosX,CharPosY:INTEGER
01FB      DIM char:BYTE
0202
0203      (* We'll use the veritical bar cursor
0229      (* that represents a text insert point
024F
0250      RUN gfx2("gcset",202,6)
0263
0264      REPEAT
0266        RUN getKISSmouse(Event)
0270      UNTIL Event.mouse.CBSA<>0 AND Event.mouse.AcX>40
028E
028F      (* Now we must translate the pixel position
02BA      (* returned to a character position
02DD
02DE      CharPosX:=Event.mouse.AcX/8
02EF      CharPosY:=(Event.mouse.AcY+5)/8
0303
0304      (* Now we can position the cursor
0325
0326      RUN gfx2("CurXY",CharPosX,CharPosY)
033D
033E      (* Make sure Echo is off
0356      SHELL "tmode -echo"
0365      WHILE char<>13 DO  \REM Carriage Return
0383        GET #0,char
038C        PUT #1,char
0395      ENDWHILE
0399      SHELL "tmode echo"
03A7      END
03A9
03AA
03AB
```

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

THE RAINBOW
One-Liner Contest
P.O. Box 385
Prospect, KY 40059

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The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

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A to Z Unlimited 133
After Five Software 90
Alpha Products 21
Ark Royal Games 83
Bernico Software 14
Burke & Burke 157
Cer-Comp 125
Cinsoft 117
Clearbrook Software Group 39
CNR Engineering 145
CoCo Cat Anti-Drug Ad 50
Cognitec 149
Colorware 22, 23
Computer Center 35
Computer Island 97
Computer Plus 3
Computer Villa 161
Computerware 71, 73
Computize 64, 65
CY-BURNET-ICS 14
D.P. Johnson 183
Dayton Associates of W. R. Hall, Inc. 128
Delphi 114, 115
Diecom .... IFC, IBC
DISKMASTER, INC. 69
Disto 55
E.Z. Friendly Software 63
Fazer Electronics 89
Frank Hogg Laboratory 99, 185, 187
Gimmesoft 169
Hard Drive Specialists 119
Hawkes Research Services 47
HJL 105
Howard Medical 34, 194
ICR Futuresoft 33
J & M Systems 101
J & R Electronics 103
Kelly Software Distributors 137
Logasoft Software 163
Metric Industries 53
Micro Works, The 127
Microcom Software ... 9, 11, 13, 15
Microtech Consultants Inc. 85
MicroWorld 179
Other Guys Software, The 29
Owl-Ware 79, 80, 81
Paparis Enterprises 161
Performance Peripherals 123
Perry Computers 16
Preble's Programs, Dr. .... BC
Prickly-Pear Software 135
PXE Computing 7
R.A.D. Products 137
Rainbow Binder 60
Rainbow Bookshelf 106, 107
Rainbow Gift Subscription 36
Rainbow Introductory Guide to Statistics Book 24
Rainbow on Tape and Disk 158
Robotic Microsystems 95
RTR Development Systems 173
Saint John's Gallery 89
Sardis Technologies 147
SD Enterprises 31
SEESOF, Inc. 47
Seibyte Software 171
Softbyte 167
Software House, The 31
SpectroSystems 69
Spectrum Projects Inc. ... 17, 25, 27
Speech Systems 40, 41, 42, 43, 44, 45
Sugar Software 165
Sundog Systems 61
Sunrise Software 67
T & D Software 112, 113, 175
Tandy/Radio Shack 49, 51
Tepco 151
TMM/Hemphill Electronics 104
Tom Mix Software 111
True Data Products 154, 155
Try-O-Byte 67
Valkyrie 133
Vidicom Corporation 91
Wasatchware 63
William Brigance 159
Woodstown Electronics 157
York 10 193
Zebra Systems 54

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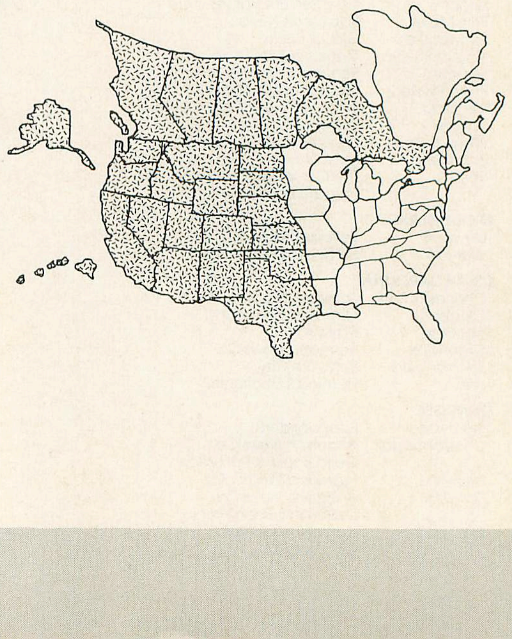

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New interactive CoCo software makes learning easy, fun. Kids love it!

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NEW LOW PRICE – 16 lessons for the price of 8! Educational Software for kids from 6 to 18.

Parents are depending more and more on supplemental education for their children. Educators know that the most effective teaching is done one-to-one. Through individual attention and self-paced progress, students learn more and retain more.

BETTER THAN A PRIVATE TUTOR

The Compass Education Software LOOK/LISTEN/LEARN approach is the next best thing to a private tutor. Unlike other educational software the Compass Library also *talks* to the student — not in synthesized speech, but in a real human voice. With on-screen textual information and attention-getting graphics, students of all ages actually enjoy learning!

SELF-PACED FOR BETTER RETENTION

The lessons advance only after the student has correctly answered the questions throughout the programs assuring that the material has been thoroughly absorbed.

SIMPLE EQUIPMENT REQUIREMENTS

All you need is the TRS-80* Color Computer (any model), computer cassette recorder and TV set. Once the cassette is loaded you need only enter two simple commands . . . and then press any key to start the lesson.

Of course you can stop the lesson at any point to study information on the screen. Just push the pause button on the cassette player. Push it again and lesson resumes.

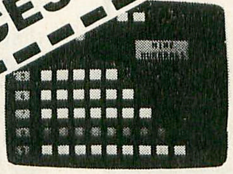
To answer questions throughout the lesson simply press the appropriate number on the computer keyboard, type in the correct answer, or follow other easy instructions. And to go back and review, just rewind the cassette. It's that simple.

CHOOSE FROM 9 SUBJECTS

There is not sufficient space in this advertisement to list all lesson titles, but here is a sample:

MATHEMATICS

In today's advanced, HiTech world, understanding and working with numbers is essential. Compass has developed three comprehensive series of math programs. From basic numerals for the very young, to algebra and higher mathematics for the older child. In between, there are programs for everything from addition and subtraction to practical everyday percentage problems.



① MATH/FRACTIONS

Grades 4 to 8

MF 1 — Numerator, denominator, bar
MF 2 — Multiplication of fractions
MF 3 — Factors and prime numbers
MF 4 — Reducing fractions, reciprocals
MF 5 — Reducing fractions, lowest terms
MF 6 — Proper fractions, mixed numbers
MF 7 — Multiplication-division of fractions
MF 8 — Addition-subtraction of fractions
MF 9 — Addition of mixed numbers
MF 10 — Changing fractions to decimals
MF 11 — Converting decimal numbers
MF 12 — Word problems using percents
MF 13 — Additional problems using percents
MF 14 — Word problems using percents
MF 15 — Finding circle area using pi
MF 16 — Using a ruler to measure fractions

② MATH/BASIC ALGEBRA

For all grades

Sixteen lessons: MBA-1 to 16

③ MATH/NUMBERS

For grades 1 to 6

Sixteen lessons: MN-1 to 16

SELF DEVELOPMENT

Writing effectively means communicationg effectively. Through the writing series of lesson students of all ages will develop basic skills needed to turn thoughts and ideas into expressive words and phrases.

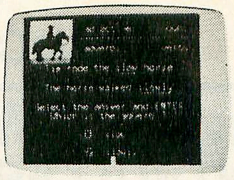
④ RULES OF WRITING

For all grades

Sixteen lessons: RW-1 to 16

LANGUAGE ARTS

A practical education begins with good reading skills and is continued with increased vocabulary comprehension and, of course, spelling. Your child will learn that reading is fun while they are also learning when to use "to," "too," and "two," and how to spell when building a vocabulary.



⑤ THE MAGIC OF SPELLING

Grades 4 to 8

MS 1 — Plurals: branches, rodeos, valleys
MS 2 — Plurals: houses, brushes, candies
MS 3 — Plurals: babies, pianos, leaves
MS 4 — Suffixes: boxed, referred, writing
MS 5 — Suffixes: paid, quickly, extremely
MS 6 — Suffixes: said, confusion, school's
MS 7 — Homonyms: two, too, to; their, there
MS 8 — Homonyms: our, are, hour; ate, eight
MS 9 — Homonyms: weight, wait; who's, whose
MS 10 – Homonyms: scent, cent; sell, cell
MS 11 – Homonyms: dew, due; course, coarse
MS 12 – Homonyms: cite, site, sight; by, buy
MS 13 – Homonyms: blue, blew, creek, creak
MS 14 – Homonyms: sale, sail; steel, steal
MS 15 – Spelling by Syllables: letter, color
MS 16 – Doubling Consonant Letters: hollow

⑥ VOCABULARY COMPREHENSION

Grades 3 to 5

Sixteen lessons: VC-1 to 16

⑦ READING COMPREHENSION

For all grades

Sixteen lessons: DRC-1 to 16

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For all grades

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For grades 4 to 12

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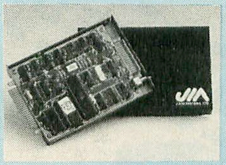
Star NX-10 Printer Only $238
NOW WITH FREE SP-C ($68.45 value)

DISK CONTROLLER

NEW FROM J&M

The DC-4 is a scaled-down version of the popular DC-2 without a parallel port. It includes a switch with 2 ROM sockets, JDOS, manual and such features as gold connectors and metal box. It accesses double sided drives and accepts RSDOS 1.1 for Radio Shack compatability.

$65 DC-4 with memory minder
($2 shipping)



RS DOS ROM CHIP

ROM chip fits inside disk controller. 24 pin fits both J&M and RS controller Release 1.1. For CoCo 3 Compatability.

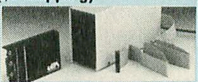
$20 each Reg. $40
($2 shipping)

DISK DRIVE SPECIALS

DRIVE 0 +

Howards Drive 0 gives you a DD-3 MPI drive, a CA-1 cable and a J&M DC-4 Disk Controller for only. Add $34 for a Disto DC-3 replacement. ($5 shipping)

$178.45 DOUBLE SIDED DOUBLE DENSITY 360K



Separate Disk Drive Components

DD-3 An MPI 52 double-sided, double density, 360K disk drive in a full height case and heavy-duty power supply.

$98 ($2 shipping) **DRIVE ONE**

DD-2 A TEAC 55B ½ height, double density, 360K disk drive in a ½ height case and heavy-duty power supply.

$188 ($2 shipping) **DRIVE ONE**

TEAC 55B bare drive, ½ height, double-sided, double density with all mounting hardware, needs CA-2 below to fit R.S. 501.

$118 ($2 shipping) **BARE**

SP-C

Serial to parallel converter converts the CoCo 4 pin serial output to run a parallel printer like Star or Epson. Includes all cables. Add $10 for modem attachment.

($2 shipping) **$68.45**

CA-1 Cable that connects the disk controller to the drive.

$24.95 One Drive

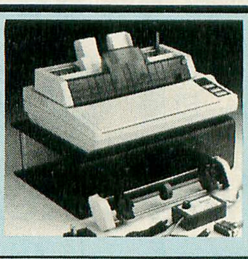
CA-2 $29.95 Two Drive

GUARANTEE — Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out, test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping).

EPSON

LX-800 $239

Friction and tractor feed included
1 60 CPS
3K Buffer
NLQ on front buttons
Package includes free SP-C serial to parallel converter and Epson tutorial on disk.



Star NX-10 Only $238

FREE SP-C serial to parallel converter while supplies last ($5 shipping)

WORD PACK RS

This ROM pack is the hardware answer for an 80 column display. It includes a built-in video controller to drive a monochrome monitor like our 123A. To get started, you need OS-9 2.0, a Y-cable or multipack interface drive 0, and a monochrome monitor.

~~**$89**~~ ($2 shipping) **$49** ($2 shipping)
While supplies last

New basic driver runs word pack without need for an OS-9.

$10

MONITORS

Sony KV-1311CR $449

Regular $625
($15 shipping)

- Vivid Color
- Vertically flat 13" screen
- Monitor/Trinitron TV with remote control
- 640 X 240 resolution at 15MHZ .37 mm Dot pitch
- RGB analog & digital; TTL; and composite inputs
- VCR inputs
- Cable to CoCo 3 $36

SONYCPD-1310 $375

Regular $550
($15 shipping)

- Monitors versions of KV-1311CR, above without TV
- Cable to CoCo 3 $36

HARD DRIVE

- 20,000,000 Bytes
- equivalent to 125 R.S. 501's on line
- micro stepping heads have 15 position per track
- automatic temperature compensation realigns head every five minutes for trouble free reads and writes
- will also work with IBM & clones
- complete package includes 20 meg drive, case & power supply, controller, and interface that plugs into slot #3 of multipack interface.
- 1 year warranty

$699.00
(5 ship)

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MISSION: RUSH'N ASSAULT

One or two players can take on the mission to rescue POW'S hidden deep inside enemy territory. Watch out for enemy soldiers, snipers, grenade launchers and many other hazards as you journey farther over enemy lines. Forge your way through jungles and swamps and other hazardous terrain as you search for the missing soldiers. Pick up grenades, extra ammo and more powerful weapons as you continue farther into your mission. The enemy is out in great force to stop your mission. Dozens of screens will keep you playing for hours. Can you succeed and rescue the prisoners? Only time will tell!

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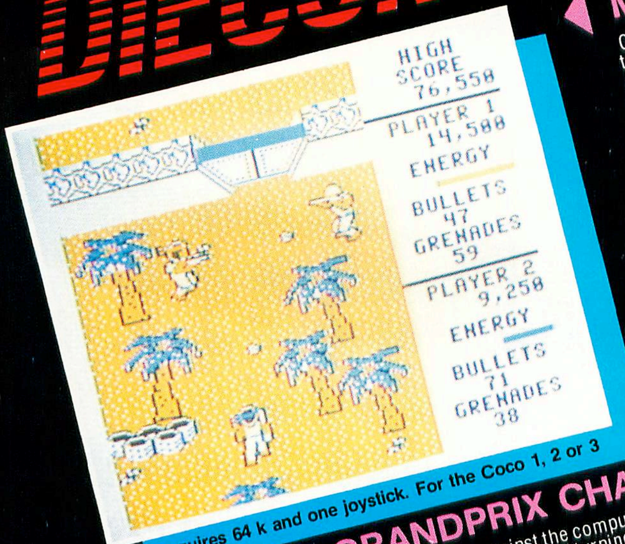

Requires 64 k and one joystick. For the Coco 1, 2 or 3

GRANDPRIX CHALLENGE

Race alone against the computer, or with a friend against the computer in this high speed racing game. You compete in 5 lap races around twisting and turning race courses. Finish the race ahead of all the computer cars and you will progress to a more challenging course. Collect repair tools as you race around the track and you will be able to increase the speed and handling of your race car. But watch out for oil slicks and water puddles on the track or you might find your car crashing into a wall. Detailed 320 × 200 graphics and realistic driving conditions make this a must for your Coco 3 collection. Many different race tracks will keep you challenged.

Tape or Disk **$28.95 U.S $38.95 Can.**

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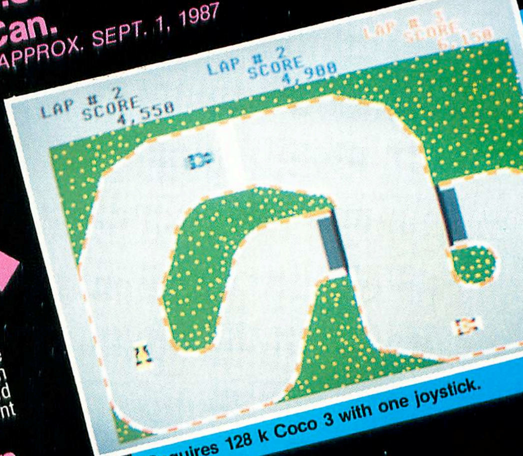
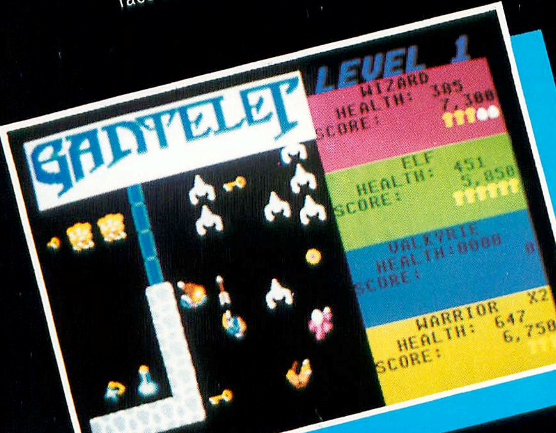


Requires 128 k Coco 3 with one joystick.

GANTELET II

It's back and better than ever. It's Gantelet II for your Coco 3. Using 320 × 200 hi-res graphics with 16 colors, we have created one of the best arcade style games you will ever see for your Coco. Four people can now play simultaneously in one game. Dozens of new levels with new monsters will challenge even the best players. Collect keys to open doors and chests, treasures, and many new magic potions to help you battle more powerful monsters. Watch out for hidden traps as you search for the exit to next level.

Tape or Disk **$28.95 U.S. $38.95 Can.** AVAILABLE APPROX. SEPT. 1, 1987



Requires 128 k Coco 3

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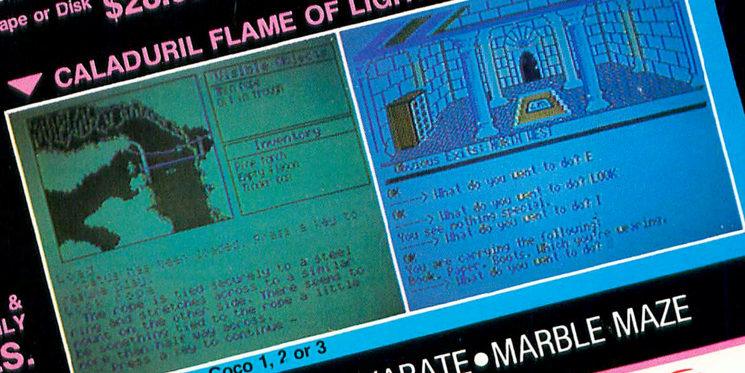

For the Coco 1, 2 or 3

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$28.95 U.S.

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Introducing PYRAMIX

For your Color Computer 3 !

Product of ColorVenture

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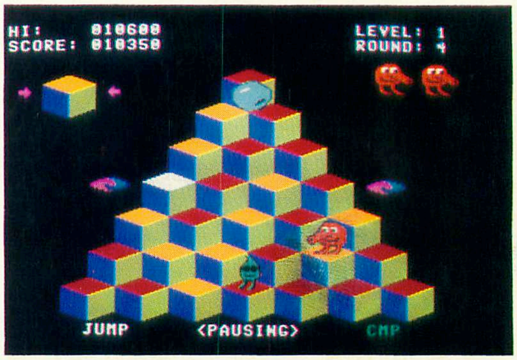
PYRAMIX features the finest in animation, graphics, sound effects and game play available today. It has all the extras you want, too, such as a pause option, RGB and CMP modes, keyboard or joystick play, help screen, multiple skill level, and the ability to backup your disk.

Best of all is the low price! Available today, for only **$24.95 on disk + s/h!**



And Lightning Strikes!

LIGHTNING RAM DISK is the most versatile RAM disk for your **512K** Color Computer 3! LIGHTNING RAM DISK will allow you to use up to 4 mechanical drives and 2 RAM drives simultaneously for a total of 6 Drives! This RAM DISK will also work simultaneously with our amazing LIGHTNING PRINTER SPOOLER! **$19.95 on disk + s/h.**

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Order all 3 for only $44.95 + s/h

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mental Freedom

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SPECIAL COCO 3 VERSION lets you work in 32, 40, or 80 column display modes. A separate version is available for the CoCo 1 and 2. Available on disk for $24.95 + s/h.

MENTAL FREEDOM by Dr. Preble! IMAGINE! Some day, a computer so advanced that it responds to your very thoughts and emotions. Imagine, some day, **thought-controlled** graphics: levitation and materialization! **PLUG IN YOUR MIND and UNHOOK YOUR JOYSTICKS**--that day is now! The Radio Shack Color Computer has many advanced capabilities, just waiting to be tapped. Dr. Preble's Programs combines the advanced technology of the CoCo with the amazing **Radio Shack Biofeedback Monitor** to bring you **"Mental Freedom."** For CoCo 2 or 3

THOUGHT-CONTROLLED VIDEO CHALLENGE? Unlike any video game you have ever played, our Thoughtware tests your ability to handle stress, to remain calm under adverse circumstances. **LIGHTNING FAST** reflexes will do you no good here, unless you first tame the fickle dragon of your mind. **Are you the secretely nervous type?** Many people can keep a "Poker Face" even when they are worried so that others may not notice; but can you really stop the worry itself? Find out with **Mental Freedom!**

AND IT TALKS! Did you know that the CoCo can produce incredibly realistic digital speech without a special speech synthesizer? The voice quality is so good, it sounds human! Honest. Best of all, no extra hardware is needed for speech, just some clever programming by Dr. Preble.

MENTAL FREEDOM - Next time your friends ask what your computer can do, show them **Dr Preble's Thoughtware!** Requires Radio Shack's Biofeedback Monitor Catalogue #63-675. **Mental Freedom** - DISK only $24.95 + s/h

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Vocal Freedom !

512K Digital Voice Recorder for your CoCo 1, 2, or 3 !

High Quality Voice Without Synthesizer !

Vocal Freedom lets you ...

- Record voice or any sound into RAM
- Record and playback at 2 speeds
- Save and Load voice to disk
- Select normal or high fidelity
- Record more than 2 minutes of speech if you have a 512K CoCo 3
- Fully compatible with CoCo 1 and 2
- Features **Sound Activated Playback.** Messages will playback automatically for your family when any noise is made. Could also scare off prowlers.

Vocal Freedom includes special cable. Requires only a low cost amplifier (RS cat. #277-1008) and any microphone.

On Disk, only **$39.95 + s/h**

Extra ... Hacker's Pac !

Incorporate digitally recorded voices or sound into your own programs. Requires **Vocal Freedom**, above.

On disk, only **$14.95 + s/h**

CoCoBraille

Emboss Grade 1 or Grade 2 Braille using your CoCo 1, 2 or 3 and a Brother Daisy Wheel printer! Fast Print to Braille conversion algorithm converts word processor files, program listings and data files into **touch readable Braille.** For use by the blind or the sighted. **No knowledge of the Braille code is necessary.** Just send print to the program and out comes Braille! Note: The complex Grade 2 conversion is very good and though not always perfect, quite readable. Requires 64K or more. Brother HR series printer or the IF-50 interface series required. Low Cost! Similar software costs 3 times as much. Only **$49.95 + s/h**

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For CoCo 1 or 2

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Dress up your Disk Directory with colorful messages and borders. Create useful help messages. Add that professional touch to your creations! Only $9.95

For CoCo 1, 2 or 3!

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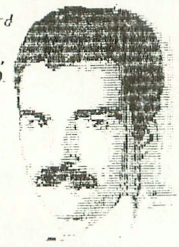

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